POWER HOUSE COMPONENTS LTD.

Albion Chambers, King Street,

NOTTINGHAM.

ENGLAND.

PHC

FUEL ECONOMY.

EVERYTHING FOR

THE BOILER HOUSE.

Telegrams—"Components," Nottingham. *Telephone 4616.*

POWER HOUSE COMPONENTS, LTD.,

ALBION CHAMBERS, KING STREET, NOTTINGHAM.

SUPPLIERS OF

STEAM BOILERS. SUPERHEATERS, ECONOMISERS, PATENT STOKERS, WATER HEATERS, STEAM PIPING, STEAM VALVES, WATER VALVES, PRESSURE GAUGES, DRAUGHT GAUGES, THERMOMETERS, PYROMETERS, BOILER MOUNTINGS, CO_2 RECORDERS, ENGINE PACKINGS, GREASE EXTRACTORS, BOILER DAMPERS, WATER SOFTENERS, JOINT RINGS, OIL ELIMINATORS, CONVEYING PLANTS, LUBRICATING OILS, GANGWAYS & GRATINGS. ASBESTOS MATTRESSES, AIR EXCLUDERS, NUTS AND BOLTS,

WE ARE SPECIALISTS IN THE PRODUCTION OF CHEAP STEAM AND CAN SAVE 15% TO 20% OF FUEL ON AVERAGE STEAM PLANTS.

PHC

WE ARE PREPARED TO CONTRACT FOR THE DELIVERY AND ERECTION OF COMPLETE POWERHOUSE AND BOILER HOUSE PLANTS.

IRON LADDERS, CHECQUER FOOT PLATES, SUCTION ASH PLANTS, FORCED & INDUCED DRAUGHT FANS, STEEL CHIMNEYS, BRICK CHIMNEYS, BRICKWORK SETTINGS, STRUCTURAL STEELWORK, ECONOMISER & BOILER CIRCULATORS, CLEANING OUT TOOLS FOR ECONOMISERS, SOOT BLOWERS, FEED WATER TANKS, MANHOLE DOORS, TUBE EXPANDERS, COUNTER-SHAFTING, COOLING TOWERS, LEATHER BELTING, BALATA BELTING, PULLEYS & HANGERS, BOILER TEST PUMPS, PIPE COVERING, BOILER COVERING, HAULAGE GEARS, ELECTRIC MOTORS, MINER ELECTRIC LAMPS.

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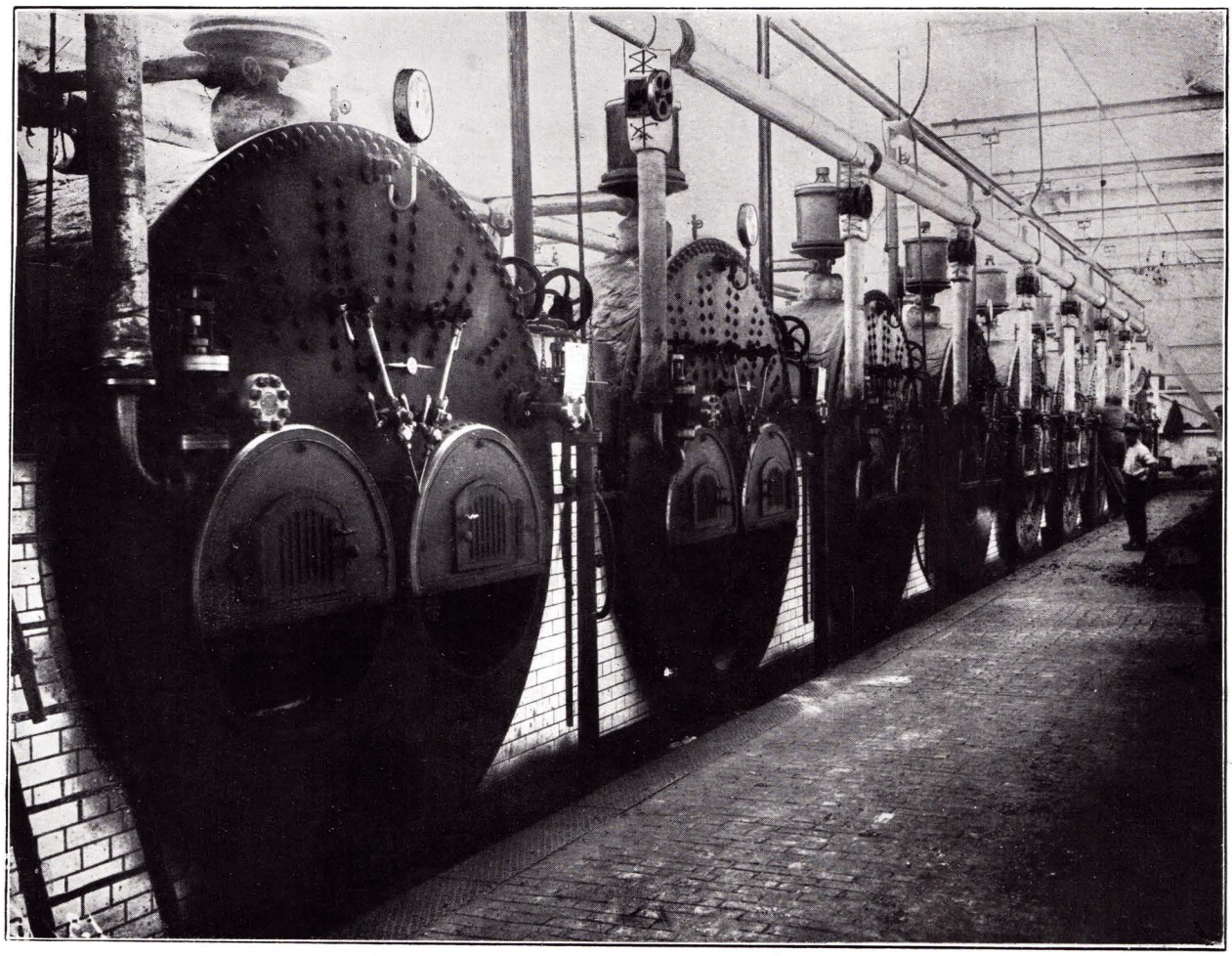


ACCESSORIES

FOR

FUEL ECONOMY.

TRIUMPH STOKER.

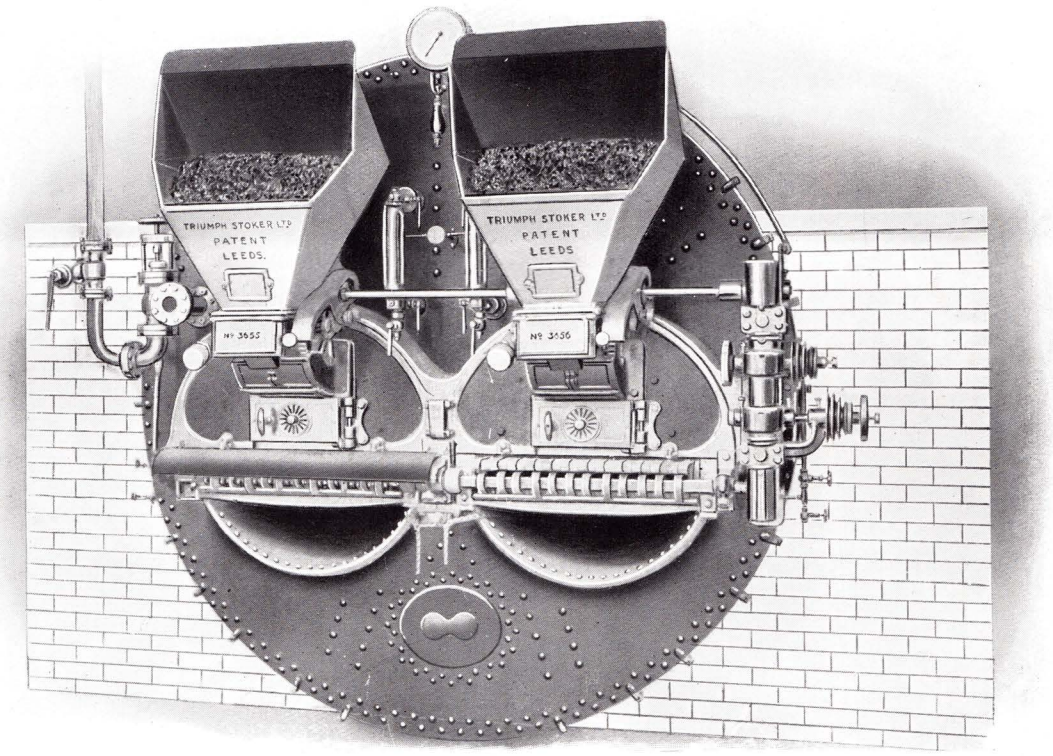


Fig. 70.

THE "TRIUMPH" STOKER.

WITH NATURAL DRAUGHT SELF-CLEANING (SOLID BAR) FURNACE.
WITH IMPROVED FORCED DRAUGHT TROUGH BAR FURNACE.

Important Points of the "Triumph" Stoker.

All the wearing parts of the trough-bars are **renewable.**

The trough-bars are fitted with rollers resting freely on the adjustable front bearer and at the back on the back bearer, which is carried by two brackets, bolted to the insides of the flue. These brackets also carry the ash pit door.

None of the parts of this Stoker **project** into the combustion chamber ; all are bolted to the cast-iron boiler front. In the centre of the latter is a door in which a butterfly-register serves to regulate the admission of air into the furnace.

The door is of large dimensions, so as to allow firing by hand in a case of emergency.

All wearing parts of this Stoker liable to need **renewal** can be easily got at, and can be detached and replaced, when necessary, without dismantling the machine.

Owing to the simplicity of design, involving **few** wearing parts, the strength and solidity of all parts, and provision made for efficient and easy lubricating, the cost of repairs and upkeep is remarkably low, and considerably less than with any other stoker.

THE "TRIUMPH" F.D. STOKER,

WITH IMPROVED FORCED DRAUGHT FURNACE.

THE "TRIUMPH" MECHANICAL STOKER.

Is of the Sprinkler Type, and during the many years it has now been in use, has been proved to possess many decided advantages over the older Stokers, whether of the Coker or Sprinkler variety.

By this machine the coal is thrown or sprinkled in small quantities over the fire by the automatic shovel at intervals of a few seconds, and no two successive charges fall in the same place.

The result is a clear, bright fire of a uniform thickness of a few inches, allowing a proper admixture of the requisite amount of air with the gases given off by the fuel, thus ensuring **PERFECT COMBUSTION WITHOUT SMOKE.**

The **FORCED DRAUGHT FURNACE** improves the combustion in cases where the natural draught is deficient—where the boiler is pushed and the maximum evaporation is needed—or where it is necessary to burn low-grade fuel.

Owing to the improved design the **self-cleaning** properties of this grate are superior to any other forced draught furnace now in the market. The firedoors rarely need to be opened, therefore there is no inrush of cold air, with consequent dropping of steam pressure, as is the case when cleaning out the clinker in the ordinary manner from a Furnace with a fixed grate.

Some Advantages of the "Triumph" Stoker.

Maximum Boiler Efficiency ensured.

Steam raising power of Boiler greatly increased, enabling same amount of work to be done with fewer boilers ; in some cases it has been possible with one boiler to do the work for which two boilers were necessary when fired by hand.

Less coal required to do the same work.

Cheaper quality of coal can be used.

Labour Saving. With small plants, where one man has to attend to both engine and boiler, it enables him to devote more time to the engine and other plant, as the boiler can be left unattended for prolonged periods.

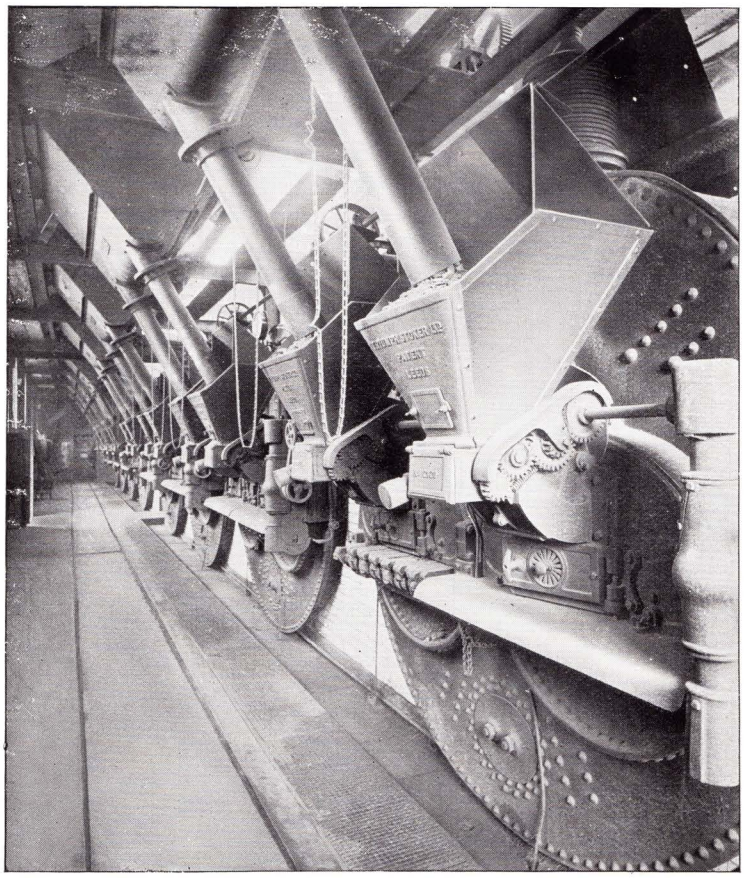
Absolute immunity from smoke, with maximum efficient $C.O._2$ record.

Cost of upkeep is considerably less than that of any other stoker.

SPECIFIC GUARANTEES GIVEN AS TO ECONOMY OR INCREASED EFFICIENCY.

POWER HOUSE COMPONENTS LTD., Albion Chambers, King Street, NOTTINGHAM.

"TRIUMPH" STOKERS.



SHOWING OVERHEAD BUNKERS AND COAL CONVEYORS.
Fig. 71.

SOME DISTINGUISHING FEATURES.

The Top Shaft working the shovel and the feeder is fixed behind the hoppers and raised above, and quite clear of the feed-box.

It is easily accessible, or removable, and is not exposed to any heat from the front of the furnace. The bearings are extra wide and fitted with adjustable caps and efficient lubricators.

The Shovel is easily renewable, and is bolted with lock nuts to **two** extra strong forged steel arms. These are fitted one on each side of the feed box, to their own axle shaft, on which is keyed (midway between the two arms) a hardened steel trigger with a wide contact surface. The four-fingered chilled cam of tappet for working the shovel and varying the length of the throw, is keyed on to the topshaft and engages this trigger. There is thus no contact of the trigger with the shovel arms, no wear or strain on them, and they consequently do not require renewal. By this arrangement the shovel distributes the coal wtth a straight forward throw evenly over the furnace, not only for the first few weeks but continuously during the life of the Stoker.

The Coal Feeder or Pusher consists of a cast-iron step plate occupying the full width of the feed box, and is worked to and fro by a crank engaging two adjustable fingers centrally fixed on the underside of the plate. The crank is rotated by a train of steel wheels from the top shaft, which ensures regularity of the feed motion, with none of the strain and wear incidental to cam and lever action. The quantity of feed can be easily regulated over wide limits, and **can be shut off independently from either furnace.**

The Cams for working the fire-bars are so designed that both the backward and forward movement of each fire-bar is worked by the same individual cam. They are slipped loosely on to a square shaft, so that each cam can be easily taken off and replaced. The shaft is forged steel, unbreakable, and has no projections to wear away.

The Automatic Scrapers, for cleaning the hollow bars, can also be worked to and fro by a hand-lever, and any dust or ash that may accumulate in the troughs whilst the fires are banked, etc., is immediately cleared out.

The Driving Gear Bracket provides a separate drive for the shovel feed and the fire-bars, **enabling either to be worked, or stopped, independently of the other,** and also to be run at varying speeds to suit the class of fuel used. The shafts are fitted with **ball bearings,** and having removable caps, can be taken out and replaced with ease. All gearing run in oil.

"HURRICANE" PATENT
SOOT BLOWERS for LANCASHIRE BOILERS.

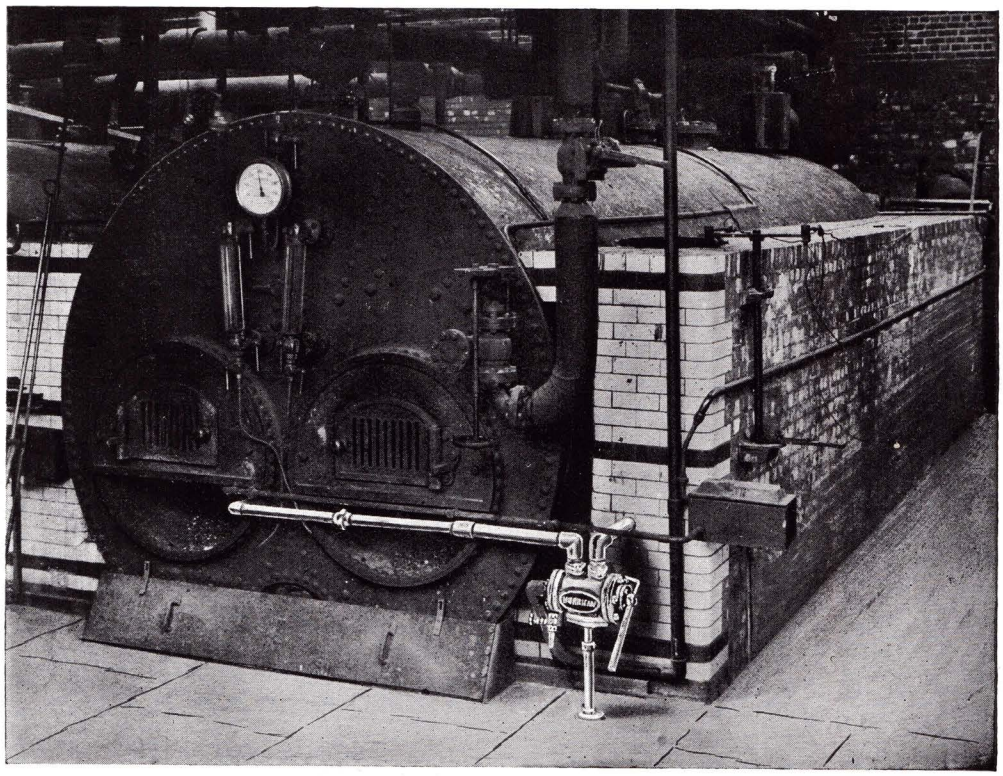


Fig. 73.

Fitted to the Lancashire Boiler the " Hurricane " Patent Blower improves the steaming and efficiency by sweeping all the dust and soot from the Boiler plates daily while the boilers are in service, at the same time removing all flue dust from the Fire Tubes, Side Flues and Flame Bed. This is effected without manual labour or expense. The One operation taking about One minute.

The Efficiency of the Plant must be increased if the expensive Shut downs for Boiler surface and Flue cleanings can be avoided, and to always maintain the Heating surfaces and Flues in a clean condition means a reduction in the coal bill and a saving in the labour charges.

For Lancashire Boilers sets of Blowers are standardized and can be fitted up in a short time by your own fitter. There is no complicated piping system requiring the presence at your works a gang of men to erect, and which, when fitted, encumbers the Flues and is liable to get out of order and endanger the boiler and setting.

These BLOWERS are GUARANTEED TO SWEEP THE PLATES and to prevent the ENTIRE loss in coal due to coatings of soot on the heating surfaces.

The " HURRICANE " Blower saves the Maximum amount of Coal at the Minimum of Expense, it uses less steam than any other blower. Its construction is scientific but simple, enabling heavy deposits of dust to be removed at each blowing.

GUARANTEED AGAINST REPAIRS FOR FIVE YEARS.

POWER HOUSE COMPONENTS LTD., Albion Chambers, King Street, NOTTINGHAM.

THE "HURRICANE" PATENT SOOT BLOWER for LANCASHIRE BOILERS.

SOOT Blowers are usually considered as only applicable to Water Tube Boilers, It will therefore interest Engineers to learn that the "Hurricane" Soot Blower, first fitted to Stirling Boilers some years ago and successfully applied to Babcock & Wilcox, Vickers-Spearing Boilers and to Economisers (see Figs. 74 & 75), **has been adapted to Lancashire Boilers and are guaranteed** to thoroughly sweep the boiler plates and to remove daily the non-conducting substances that retard evaporation and are only removed in many plants prior to the Insurance Company's annual inspection. (See Fig, 73).

The "Hurricane" Soot Blower must not be confused with Mechanical Flue Cleaners which consists of a series of small nozzles placed on the bricks in the side and bottom flues to blow the flue dust away. Mechanical Flue Cleaners do not sweep the Boiler plates and consequently do not save fuel; it is obvious the Boiler setting must be damaged by steam blowing on the bricks. The "Hurricane" Soot Blower **does not damage the setting,** it blows dry steam that **sweeps the boiler plates thus saving fuel.** It thoroughly **removes all dust from the fire tubes and side and bottom flues.**

The benefits resulting from the use of "Hurricane Blowers" in Lancashire Boilers are therefore **two-fold** and must be apparent to Steam Users. The principal advantages are the heating surface is maintained in a **continuously clean condition** and the loss in efficiency due to coatings of soot and other **non-conducting substances are eliminated.**

The following is a comparison of the temperatures of the gases leaving two similar Boilers working alongside under the same conditions, one only being fitted with "Hurricane Blowers." The result more than justifies the moderate outlay involved on the installation.

Gases leaving Boiler in which BLOWERS WERE NOT IN SERVICE ...		**720°**
Gases leaving Boiler having "HURRICANE" BLOWERS IN SERVICE ...		**480°**
	GAIN	**240°**

The loss of efficiency by not blowing	**5%**
Reduced by daily blowing to	**1%**
The Loss in Superheat by discontinuing operating a "Hurricane" Blower for 1 week	**10%**

By removing all flue dust from the flues at the same time as the plates are swept, while the Boiler is in service, the cost of the flue cleaning by hand is completely eliminated and the losses consequent on stopping and cooling off the Boiler to allow men to get inside.

Where complete installations of "Hurricane" Blowers are fitted to plants consisting of Boilers and Economisers **it is guaranteed that all dust and soot is removed from the main flues and the Economiser Soot Pit.** (See Fig. 76).

Steam Users have an additional inducement to fit up complete installations in the form of a **Patented Dust Collecting Chamber** which can be incorporated in the boiler plants so all soot and flue dust is collected and delivered to carts or railway wagons without manual labour **whilst the Boilers are in full service.**

Where Hurricane Soot Blowers are fitted to Economisers, the tube surfaces are thoroughly swept and maintained in a clean state, or when worked in conjunction with Mechanical Scrapers, **the "Hurricane" Blower prevents flue dust heaping amongst the banks of tubes and fouling the Scrapers on their downward travel.** It is notable that the **Patent Operating Cock** made for use with "Hurricane" installations is tested according to Board of Trade requirements to **350 lbs. pressure and can be recommended for use with high superheated steam temperatures.**

POWER HOUSE COMPONENTS, LTD., Albion Chambers, King Street, NOTTINGHAM.

"HURRICANE" PATENT
SOOT BLOWERS for WATER TUBE BOILERS.

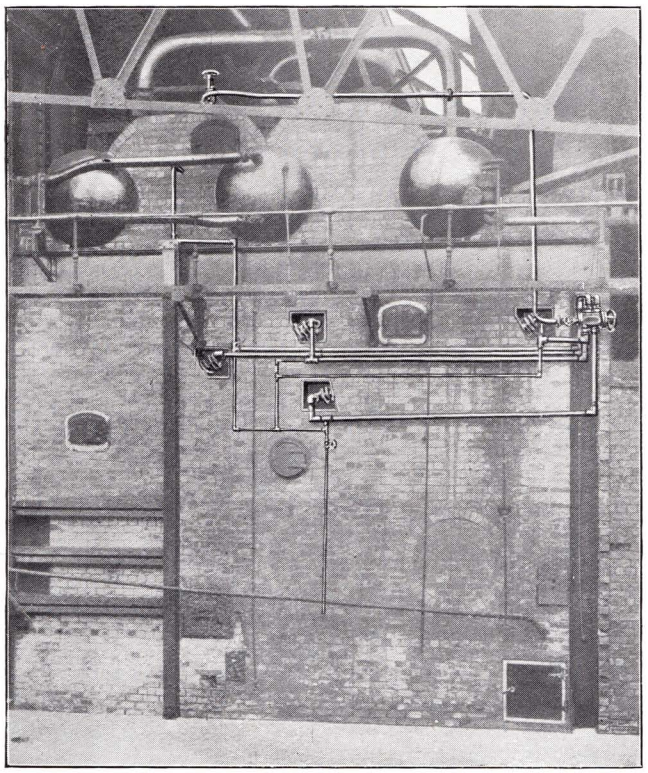


Fig. 74.

The "Hurricane" Blower fitted to a Stirling or Babcock & Wilcox boiler consists of a Blower Pipe, strong Cast Iron Wall Box, Stuffing Box and Packing Gland, and a simple effective operating gear. The Blower Pipe is fitted in the side wall at right angles to the boiler tubes and is constructed **to discharge simultaneously jets of steam across the boiler between the rows of tubes.** These jets of steam sweep the dirtiest surfaces of the boiler tubes which are out of the line of draught and cannot be reached by jets of steam blowing with or against the draught.

In order to clean the entire circumference of all the tubes in the boiler and to do so without danger to the tubes themselves, **it is essential that steam jets blow across the boiler between the rows of tubes,** as the boiler tubes are not staggered in this direction. Effective cleaning cannot be expected from steam jets which discharge into staggered nests of tubes, as such jets impinge on the boiler tubes and may in time cause tube failures.

In Babcock & Wilcox Boilers dust always accumulates on the upper surfaces of the tubes forming cones 1" to 1½" deep after a few days' steaming. **By means of the "Hurricane" Blower these deposits can be removed at any time whilst the boiler is in service.** Messrs. Babcock & Wilcox advise their Clients that "All heating surfaces must be kept clean outside or there will be a serious waste of fuel. Never allow one sixteenth of an inch of soot to collect on surfaces between cleanings." **The "Hurricane" Blower is the most effective method of cleaning the tube surfaces and does so with the minimum expenditure of steam.**

POWER HOUSE COMPONENTS, LTD., Albion Chambers, King Street, NOTTINGHAM.

EVERYTHING FOR THE BOILER & POWER HOUSE.

POWER HOUSE COMPONENTS LIMITED

ENGINEERS & MERCHANTS.

Telegrams:
"COMPONENTS, NOTTINGHAM."

Secretary:
W. RONALD COOPE, F.C.A.

REGISTERED OFFICE:
Albion Chambers,
KING STREET,
NOTTINGHAM.

Telephone: 7270.

Codes used:
A.B.C. 5TH & 6TH EDITIONS
MARCONI INTERNATIONAL
WESTERN UNION.

DCR/WLR.

21st. June 1926.

D.P.Scott Esq., A.M.I.Mech.E.,
C/o. Messrs J.&.G.Coleman Ltd.,
Carrow Works,
Norwich.

Dear Sir,

I have been asked by my Father, Mr David Rushworth of the Clay Cross Co.Ltd., who had the pleasure of meeting you on Thursday last at the occasion of the visit of the Institute of Mechanical Engineers to your Works, to forward you the enclosed Catalogue of Fuel Economy Specialities and trust same will be of interest to you.

This Company makes a speciality of Soot Blowers for Water Tube, Lancashire Boilers and Economisers and we have fitted many hundreds of these in connection with steam plants.

Any further information you may desire will be gladly tendered on learning your requirements.

We are, dear Sir,

Yours respectfully,

per POWER HOUSE COMPONENTS, LTD.

D.C. Rushworth

PHC

SOOT BLOWERS *ARE* SOOT BLOWERS

FLUE CLEANERS *ARE* NOT SOOT BLOWERS

CIRCULAR No. 169

THE

PLEASE FILE FOR REFERENCE

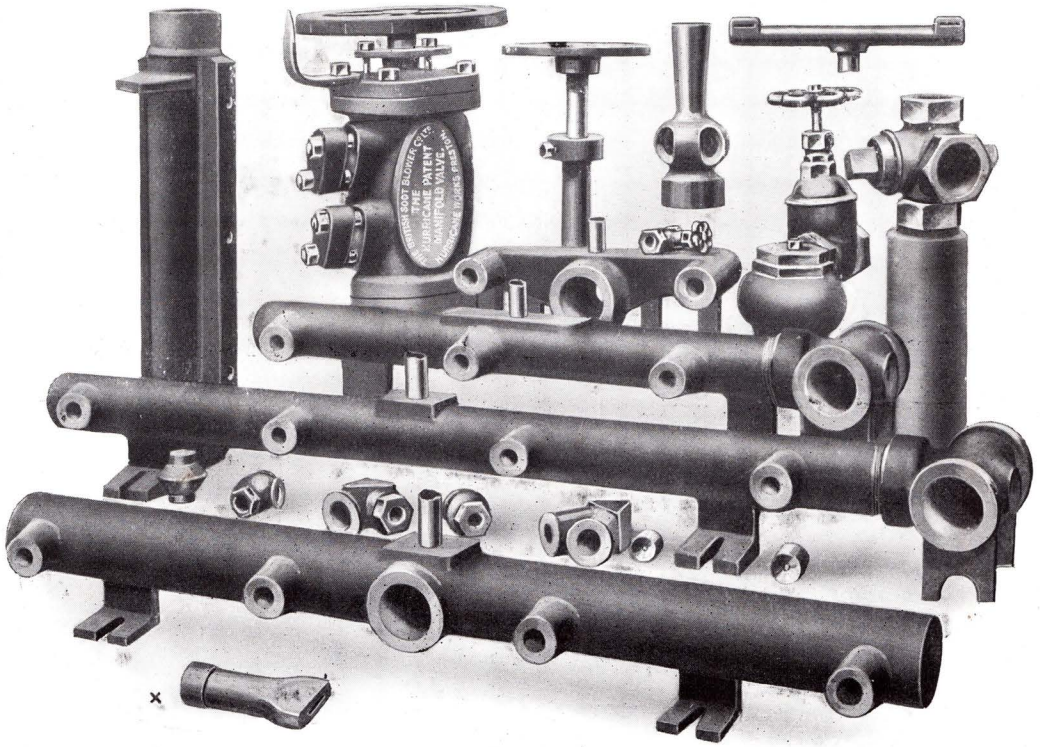
'Hurricane' Soot Blower

Is protected by Letters Patent. It is the only apparatus made for

SWEEPING THE PLATES OF LANCASHIRE BOILERS.

It thoroughly removes **all soot from the boiler plates,** and removes and collects **all dust from the flues** daily **while the boiler is in service.** We offer you **fifteen years' experience** in making and erecting Flue Cleaning and Dust Collecting Plant. We are the **Pioneers** of this class of apparatus. We designed and fitted, in **1911,** the first Flue Cleaning Equipment in a Lancashire Boiler in Great Britain. Our inventions for this type of boiler are :—

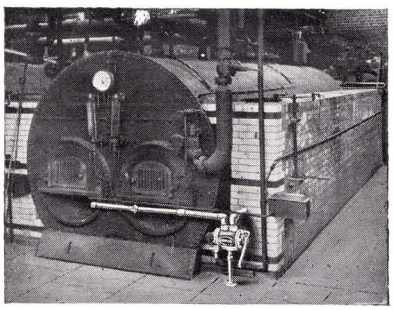
1911 – The 'Vulcan' Flue Cleaner ; 1915 – The 'Hurricane' Flue Cleaner ;
1921 – The 'Hurricane' Soot Blower.



A group of 'Hurricane' Soot Blowers with, in foreground, a Vulcan Flue Cleaner Nozzle x

POWER HOUSE COMPONENTS, LTD.

The Plates of Lancashire Boilers must be thoroughly cleaned every day or there will be a serious waste of Coal.



The "Hurricane" Soot Blower fitted to Lancashire Boilers in a Preston Cotton Mill.

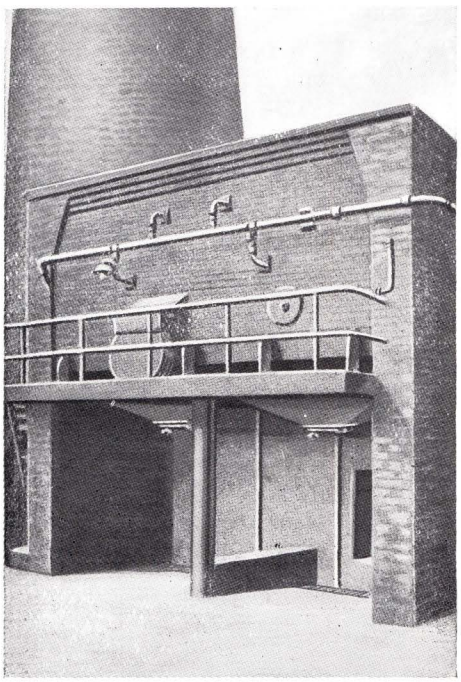
It is impossible to prevent **Soot** depositing on the plates of Lancashire boilers. **Soot** commences to deposit as soon as the fires are lighted. **Soot** is a non-conductor of heat. There are only two materials that rank higher than **Soot** as a non-conductor of heat. **Soot** is **third** in the list. **Asbestos** is **thirty-first.** No one would think of covering the plates of Lancashire boilers with **Asbestos. Soot** covers **your** boiler plates day in and day out **throughout the year** and

SOOT WILL STOP FIVE TIMES AS MUCH HEAT AS ASBESTOS.

"Mechanical" Flue Cleaners do not clean the plates. Steam blown from nozzles laid on the brickwork of the flues does not remove the **Soot** from the plates. The claim put forward on behalf of flue cleaning systems consisting of nozzles laid on the brickwork of the flues to which steam is led through small bore steam pipes, that a minimum **coal** saving of 5 per cent. is effected is ridiculous. They would appear to be made for the purpose of justifying prices out of all relation to **cost of material.** There is only one apparatus made for sweeping the plates of Lancashire boilers while in service. It was invented by us after ten years' experience in making and fitting Soot Blowers and Flue Cleaning and Dust Collecting Plant. It is **the British Soot Blower,** now widely known as

THE "HURRICANE"

and adopted by many of the largest coal users for both Lancashire and Water Tube Boilers and for Economisers in place of mechanical scrapers.



A "Hurricane" Dust Collector receiving dust from six Lancashire Boilers at Messrs. The Turner Paper Mills, Ltd., Rawcliffe Bridge. In service seven years.

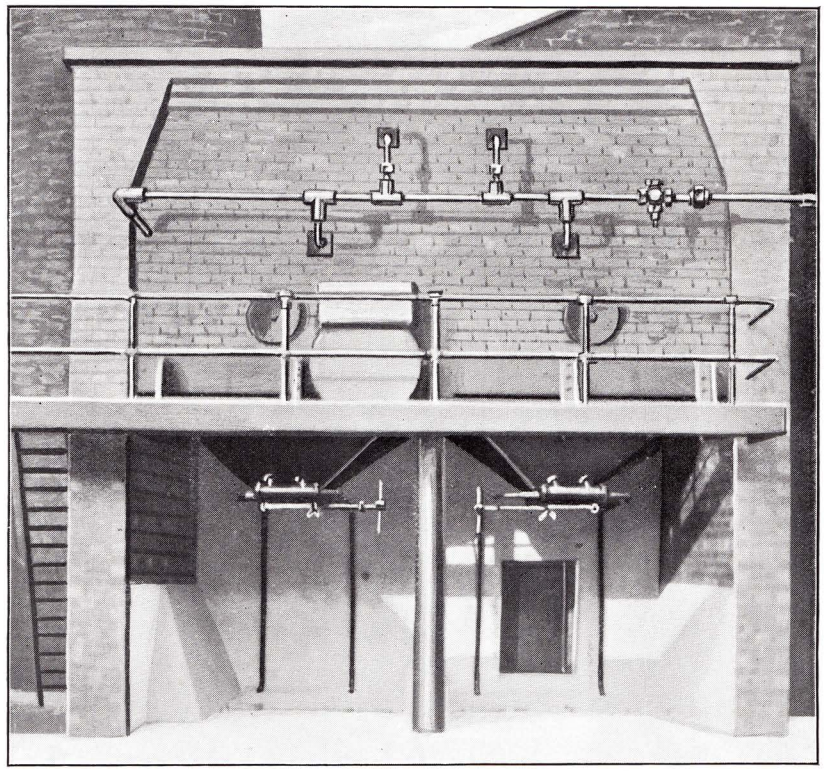
PROOF POSITIVE—CONSULTING ENGINEER'S REPORT:—

A Well-known Consultant Engineer reported to his clients after inspecting a range of Boilers fitted in the Flame Beds with "Hurricane" Soot Blowers, and in the side Flues with Flue Cleaners as follows:—

"The Boiler Shell Plates in bottom Flues were perfectly clean, but thickly coated with soot in the side Flues."

POWER HOUSE COMPONENTS, LTD.

THE "HURRICANE" PATENT DUST COLLECTOR.



ABOVE SHOWS DUST COLLECTOR FITTED TO CHIMNEY BASE.
Fig. 76.

The "Hurricane" Dust Collector is designed to remove and collect all soot and dust daily without manual labour **whilst the boilers are in service.** The non-conducting substances which retard evaporation are swept from the heating surfaces of

THE BOILERS, SUPERHEATERS AND ECONOMISERS,

and all dust is swept from the flues and the Economiser pit. The "Hurricane" Patent Soot Collector can be erected in any position for convenient removal of the dust by wagons or carts. It is fitted with Patent Water Sprays for damping the dust, which is drawn off in a wet state so as not to cause a nuisance by being blown about the plant. Complete installations **have been in use for ten years** with entirely satisfactory results, as shown by the following letters received from Clients :—

"The Flue Cleaning Apparatus you installed for us about ten years ago has given good results in keeping our boiler flues clean, and is an improvement over periodical hand cleaning. Another satisfactory result has been **the better steaming of our boilers.**"

"We have had all our boilers here (nine) fitted with these Blowers for many years, and find **no need for any regular flue cleaning whatever.** We use the Blowers also to clean out the Economiser Pits. We have found **a very remarkable improvement** in keeping up the steam pressure and have been **able to lay one boiler off permanently.**"

"We fill a cart with dust from the chamber once a week. **There is no discharge from your Patent Stack while using the Blowers.** We do not use much water ; just sufficient to damp the dust."

POWER HOUSE COMPONENTS, LTD, Albion Chambers, King Street, NOTTINGHAM.

ASBESTOS MATTRESSES

FOR ECONOMISERS.

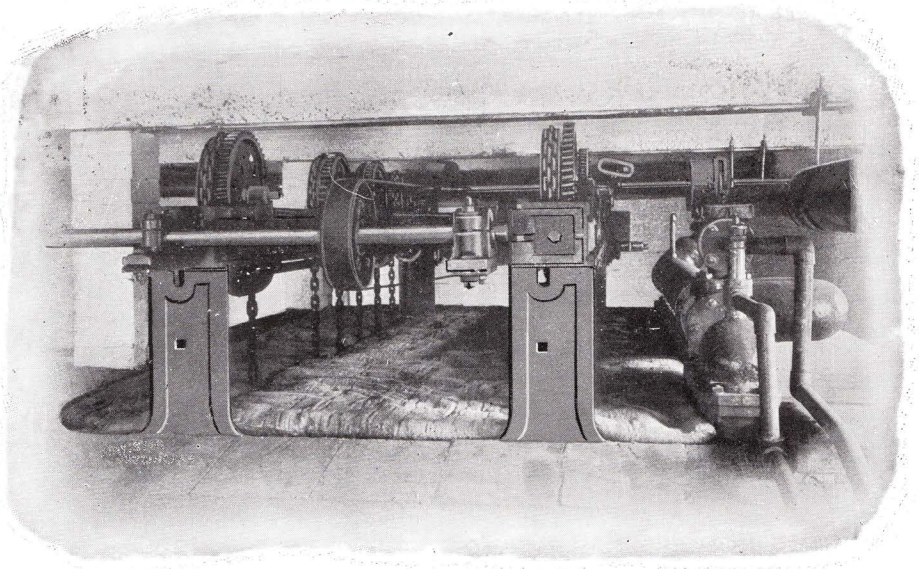


Fig. 50.

P.H.C. Asbestos Mattress Fitted to the Top of the Economiser.

The top of the Economiser is frequently left exposed resulting in a great loss of heat due to radiation and thereby lowering the efficiency of the machine.

To avoid this, it is essential that an efficient movable covering be used, giving easy access for inspection and cleaning.

P.H.C. Asbestos Mattresses are specially made for these requirements and to fit the irregularities of the Economiser top.

It would take a considerable length of ordinary steam piping to make the equivalent area of the Economiser top, but whilst pipes are nearly always covered this large radiating area is often overlooked.

Please send for prices, giving the size and dimensions of the top of your Economiser.

POWER HOUSE COMPONENTS, LTD., Albion Chambers, King Street, NOTTINGHAM.

ECONOMISER CHAIN HOLE AIR EXCLUDER

EASILY AND QUICKLY ATTACHED.

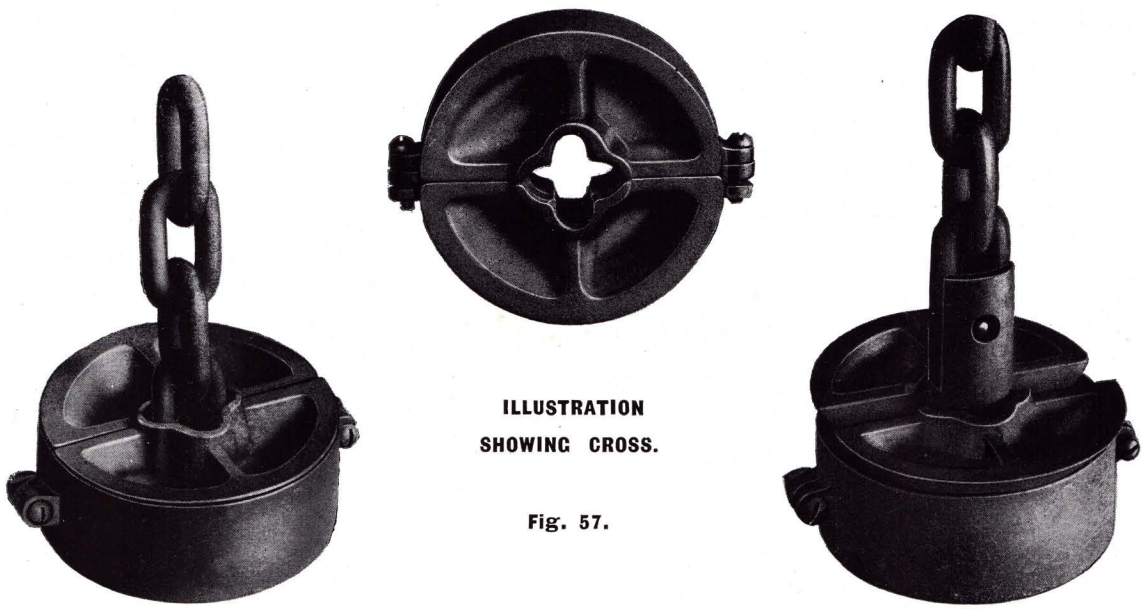


ILLUSTRATION SHOWING CROSS.

Fig. 57.

The ideal steam producing installation should have its flues Air-tight, from the Boilers to the Chimney top.

A considerable leakage of air takes place through the Economiser chain holes on the Economiser top, and this is greatly accentuated where induced draught is adopted.

In order to emphasize the importance of **Economiser chain hole Air-leakage,** it is pointed out by high authority that **24 cubic feet of air per minute** will flow through **a hole one square inch in area** under a $\frac{3}{4}$" Water Gauge.

During a recent test **when Chain Hole Air Excluders had been fitted,** it was shewn that the average outlet feed temperature was **increased by 7 degrees Fah.** It can therefore be taken that an average installation of these Excluders will save 1% of your fuel through Air leakages being eliminated.

The P.H.C. Economiser Chain Hole Air Excluder is specially designed **to prevent these air leakages,** and to accommodate itself to the twist of the chain and the passage of the Chain Rod when it comes to the top of the Economiser before reversing. It also reduces the risk of fire due to live soot being carried out of the flues by the chain.

The P.H.C. Air Excluder can be fitted to the Economiser chains whilst the gearing is in motion.

It is comprised of a Round Inverted Conical Box made in two halves fastened together by bolts, and two Inner Slides shaped to suit the irregularities of the chain. It is designed so that no fixings are required, its own weight being sufficient to hold it in place.

POWER HOUSE COMPONENTS, LTD., Albion Chambers, King Street, NOTTINGHAM.

THE NATIONAL PATENT CIRCULATOR

FOR PREVENTING EXTERNAL WASTING OF ECONOMISER PIPES.

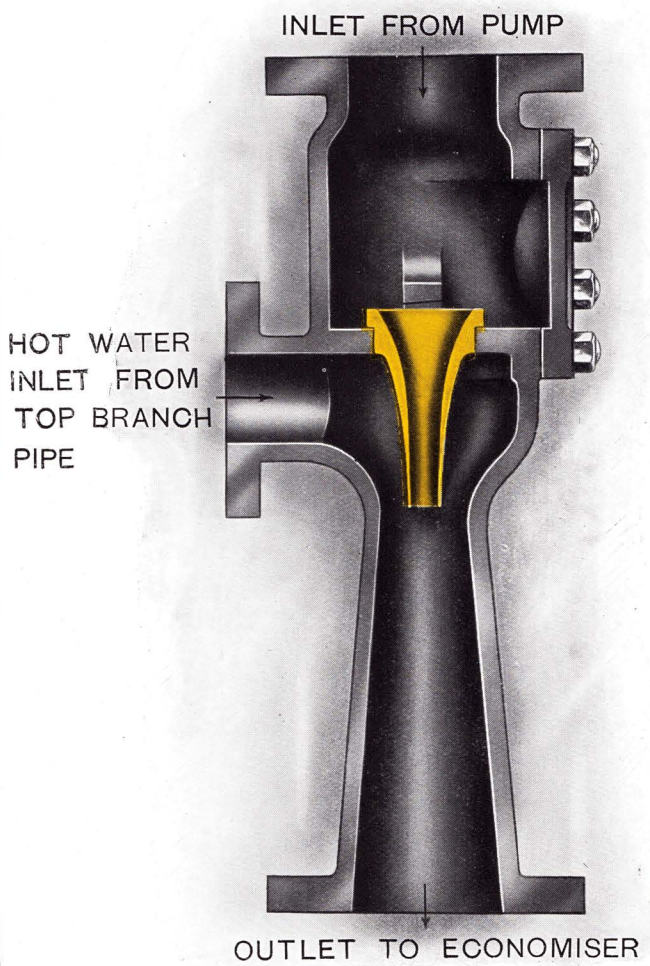


Fig. 35.

IT is well known that if the feed water be delivered into an economiser **at a temperature less than 100° F.** a portion of the flue gases in contact with the pipes at this temperature condenses on the external surfaces of the pipes and **sets up rapid wasting** involving costly pipe renewals.

Corrosion due to damp brickwork also progresses more rapidly when the temperature of the feed water at the inlet end of the economiser is low.

To check this action it is necessary that the water should enter the economiser at a temperature above 100° F. This object is attained by the **"National" Circulator.**

The Circulator automatically draws hot water from the top branch pipe into the cold feed supply, thus raising its temperature and preventing the chilling effect of cold feed water on the economiser pipes.

Some actual results obtained:

Initial feed temperature.	Temperature of feed entering Economiser.	Temperature of feed leaving Economiser.
70° F.	115° F.	165° F.
60° F.	110° F.	270° F.
74° F.	145° F.	234° F.

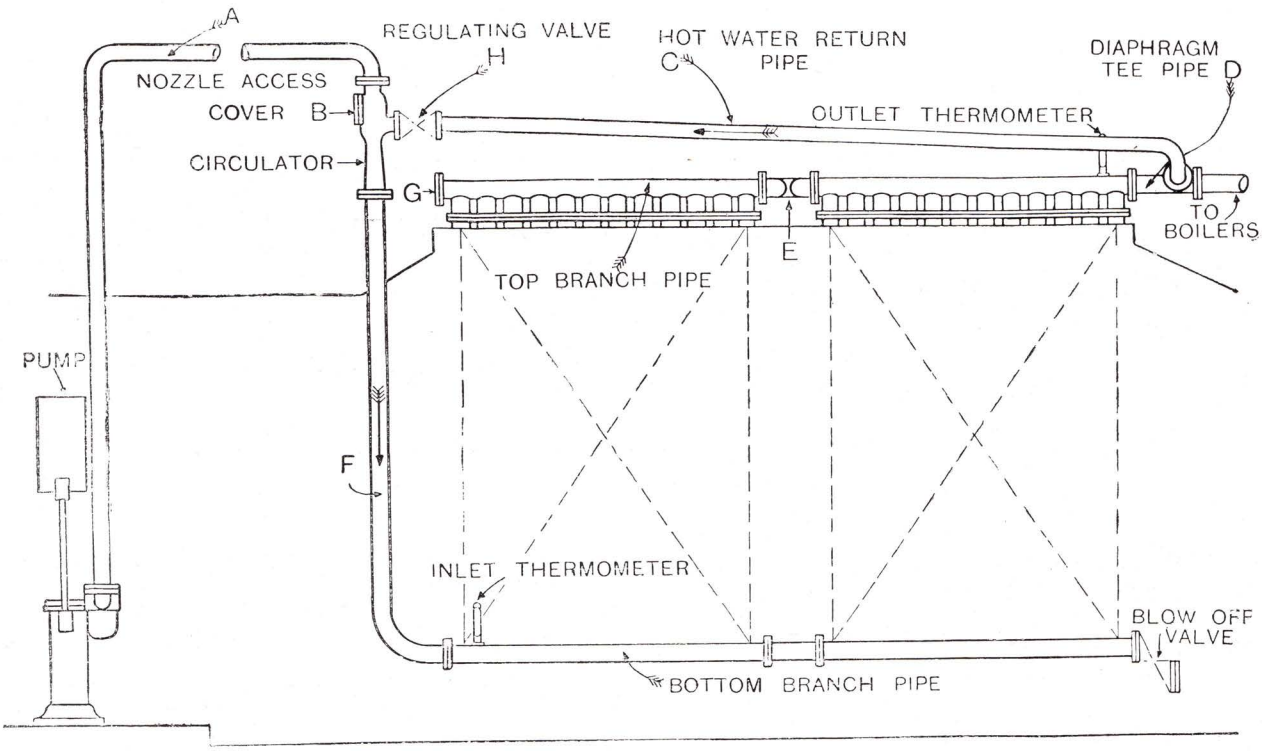
We have supplied large numbers of these Patent Circulators for working in conjunction with existing Economisers of Clay Cross and Green's make, and by the adoption of these Circulators the corrosion of the tubes has been arrested.

We shall be pleased to supply any district references on request, and drawings with full instructions for fixing will be supplied to customers free of cost. We undertake to send a skilled fitter to superintend the erection at site, at a moderate charge, if required.

POWER HOUSE COMPONENTS, LTD., Albion Chambers, King Street, NOTTINGHAM.

THE NATIONAL PATENT CIRCULATOR.

INSTRUCTIONS FOR FIXING.



The Circulator should be fixed in the feed pipe range **A** between the Pump and the Economiser.

The connection of the Circulator to the top branch pipe of the Economiser is usually made by inserting a Diaphragm Tee Pipe at the "hot" end as shown in the illustration.

Alternative methods to be adopted in special cases are :—

By means of a Taper Bend fixed at the "cold" end **G**, or

By a special Expansion Bend fitted at **E** with branch for hot water return pipe.

Access to the withdrawal nozzle of the Circulator can be obtained by removing the bolted cover **B**.

If the feed water is at all corrosive, the Hot Water Return Pipe **C** is preferably made of cast-iron.

POWER HOUSE COMPONENTS, LTD., Albion Chambers, King Street, NOTTINGHAM.

P.H.C. ECONOMISER CLEANING OUT TOOLS.

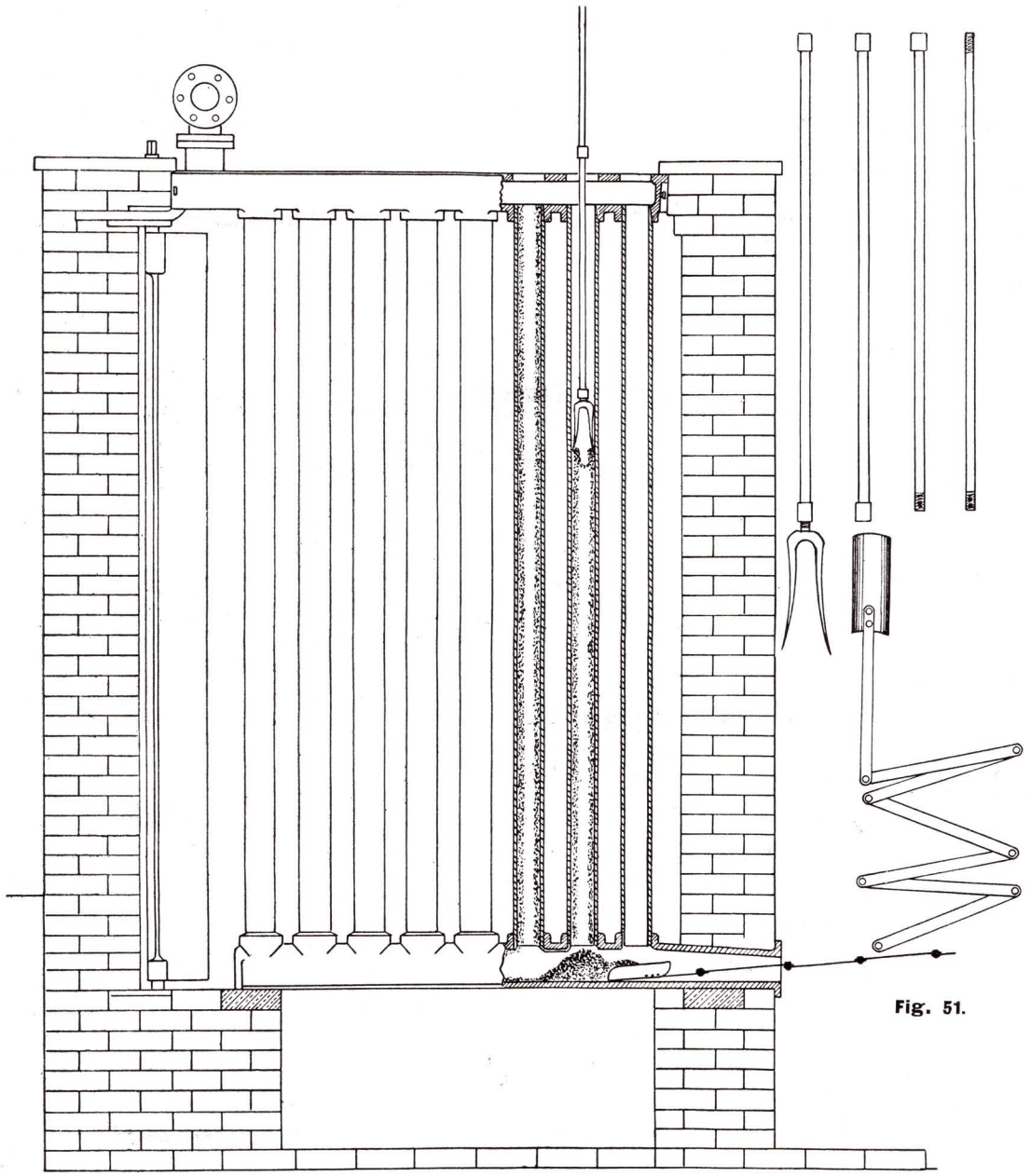


Fig. 51.

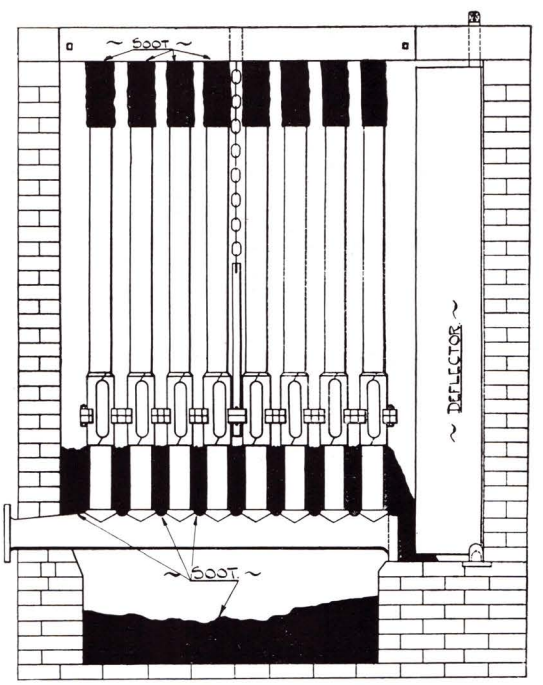
Feed water usually contains various impurities which are precipitated by heat in the Economiser, and therefore, to maintain the Economiser in a high state of efficiency, it is necessary for the vertical tubes and headers to be kept clean internally, otherwise the transmission of the heat through the walls of the heating tubes becomes impaired. The set shown above has been devised for use where the sediment is not of a hard nature. We carry these outfits in stock and same can be supplied at short notice. The set consists of spring fork with three lengthening rods for scraping the inside of the tubes as shown, and a semi-circular steel shovel with collapsable handle for cleaning out the bottom headers.

PRICE PER SET - - £3 - 10 - 0.

POWER HOUSE COMPONENTS LTD., Albion Chambers, King Street, NOTTINGHAM.

ECONOMISER SPACE CLEANER.

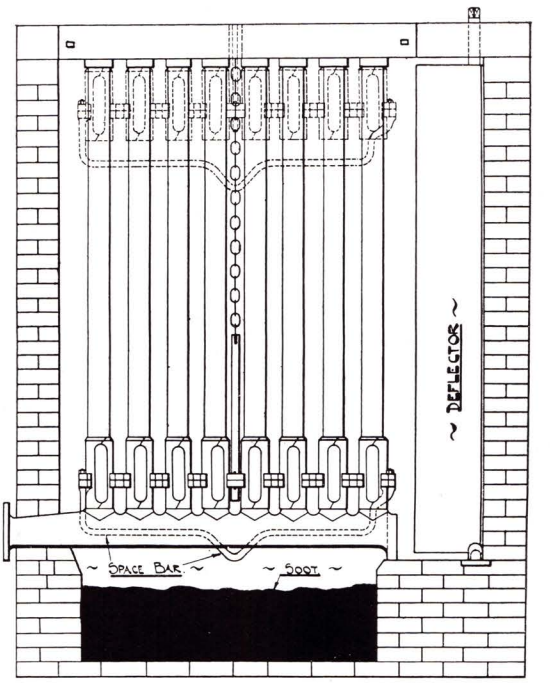
Average Condition of the Economiser
when NOT FITTED with the
BOTTOM BOX SPACE CLEANER.



Sketch of the Economiser, shewing the accumulation of soot between the tubes taking place when there is plenty of room in the Soot Chamber. This occurs regularly in actual working practice.

Fig. 52, like Fig. 51.

Condition of the Economiser
when FITTED with the
BOTTOM BOX SPACE CLEANER.



Sketch of Economiser, shewing the Tubes free from the deposit, which is continuously directed to the Soot Chamber by means of the Space Bar crosswise, and the Draught, lengthwise.

Fig. 53.

The purpose of this appliance is to constantly and automatically clear the sooty deposit from the bottom cross Tubes of the Economiser, in a similar way to that in which the vertical Tubes are kept clean by the ordinary Scrapers. This, in every-day working practice, also ensures that the ordinary vertical Scrapers are permitted to travel the full length of the Tubes, so they are not gradually restricted in their operations by the building up of soot round the bottom Cross Tubes as mentioned above.

It is within our certain knowledge that the undesirable conditions set forth above do exist in a greater or less degree in every Fuel Economiser, and it is a mistake to assume that because there is plenty of room in the Soot Chamber the soot will be deposited there without further assistance than is given by the vertical Scrapers.

If the ordinary Scrapers are considered to be a good investment, we claim that our arrangement for cleaning the lower tubes is an equally good proposition, as the cost is only moderate.

POWER HOUSE COMPONENTS LTD., Albion Chambers, King Street, NOTTINGHAM.

ECONOMISER PRESSURE GAUGE & SYPHON.

Fig. 55.

PRESSURE GAUGE AND SYPHON.

It is very necessary, a reliable Pressure Gauge that cannot be interfered with be fitted to your Economiser, so you can see at a glance if excessive and undesirable pressures are being formed in the machine, whether due to scale or other causes. A P.H.C. Tell-Tale Pressure Gauge with lockable front will indicate to you the conditions of working.

The above shows the Standard Economiser 7" dial Pressure Gauge having maximum pointer and lock-up front fitted to Copper Syphon having special attachment for fixing into either top or bottom Branch Pipes.

PRICE £5 - 0 - 0 NET. COMPLETE.

POWER HOUSE COMPONENTS LTD., Albion Chambers, King Street, NOTTINGHAM.

P.H.C. AUTOMATIC BOILER DAMPER AIR AND FIRE EXCLUDER.

CAN BE FITTED TO ALL SIZES OF SLIDING DAMPERS.

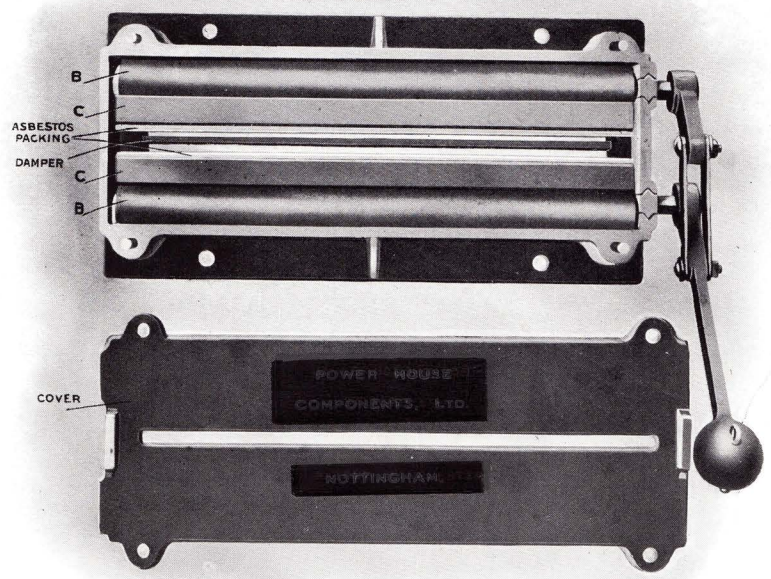


Fig.95

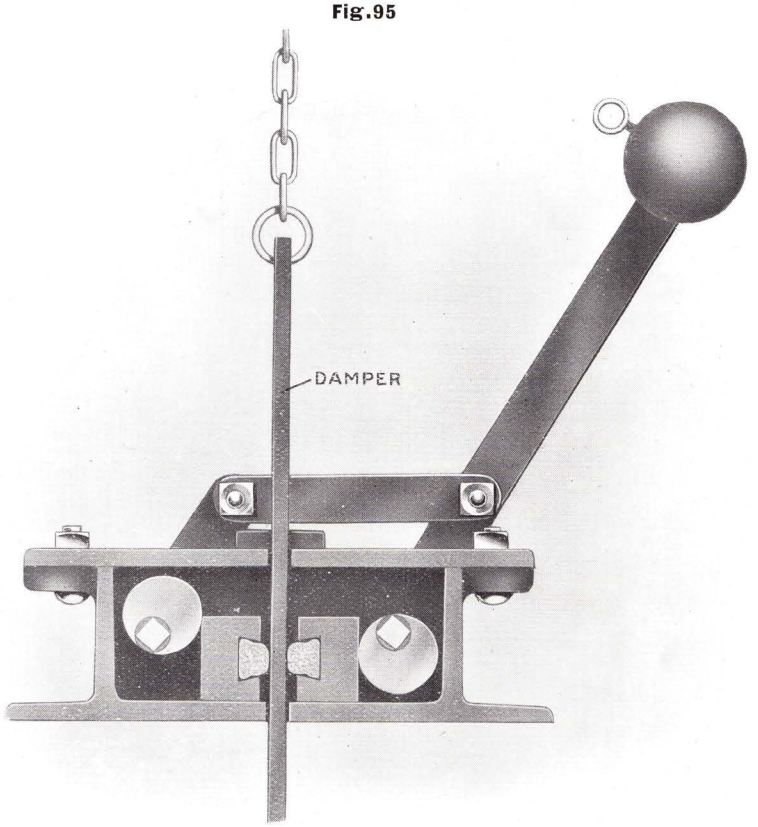


Fig. 96

TYPE B.

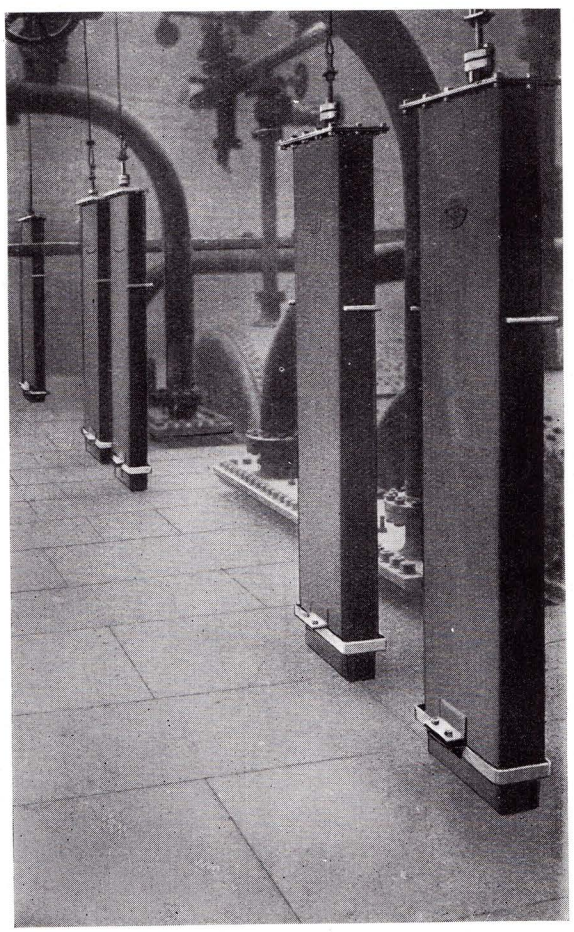
DESCRIPTION.

THIS device entirely prevents the admission of cold air past the Damper Plates, no matter how bent or twisted they may be. By this means the full Draught is obtained over the firegrate, and the Economiser flue temperature is maintained at the highest possible point. When the Ball Lever is raised the Damper is free to move. When it is set and the Lever released it causes the Cam Shafts to force the Asbestos Packed Gripping Bars against the Damper, entirely closing the opening and at the same time locking the Damper in position.

PATENT AIR-TIGHT DAMPER COVER.

One Man can lift off in case of accident to Connections or to Damper.

The Cover can be removed in about 1 minute for inspection.



The Cover has no parts to get out of order.

SIMPLE.

EFFICIENT.

Improves the draught.

Of proved value.

Fig. 61.

MADE OF MILD STEEL FOR LIGHTNESS OR OF CAST IRON IF PREFERRED.

IT is a well-known fact that any air leakages from outside into the flues lowers the temperatures of the gases and impairs the draught, thus not only lowering the actual efficiency of all the gas between the leak and the chimney, but also destroying the initial efficiency of the furnace. **The most Efficient Steam Plant has no Air Leakages** to reduce the temperature of the flue gases and the draught. **The Patent Boiler Damper Air Excluder** as shewn in the above illustration is of a very simple mechanical construction and made of thin seamless mild steel plating for lightness so that one man can lift it off in case access is required to the damper plates or lifting rods. These Covers can also be supplied in cast iron if preferred.

SMALL PERCENTAGES OF GAIN MAKE THE ESSENTIAL CONDITION OF EFFICIENCY.

POWER HOUSE COMPONENTS, LTD., Albion Chambers, King Street, NOTTINGHAM.

P.H.C. ANTI-INCRUSTATION PUMP & CISTERN.

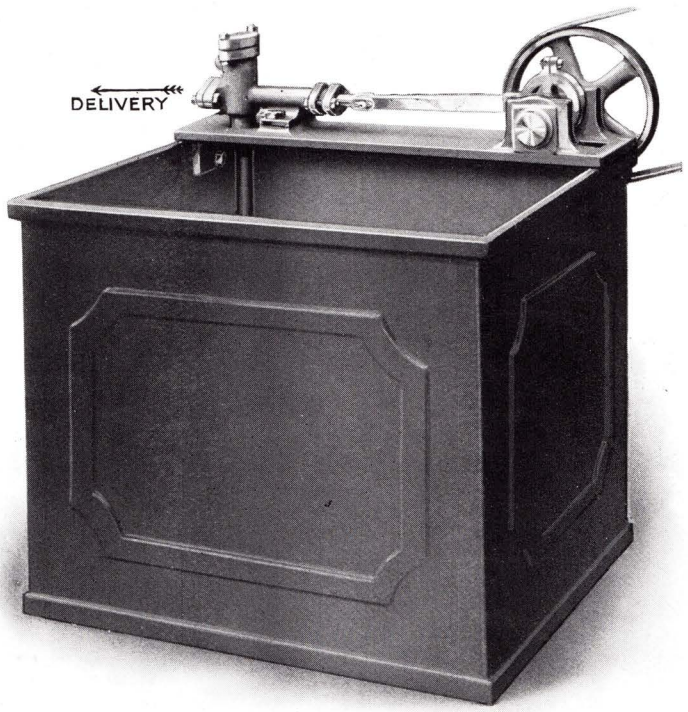


Fig. 54.

THE above illustration shows our Anti-incrustation Pump and Cistern which is usually supplied for Economisers which are working with Feed Water, that has not previously been treated through a Water Softening Apparatus. The outfit consists of suitable pump having bodies, ram and Valve made entirely of Gunmetal, and the Cistern is preferably of cast iron but is also made in wrought iron if desired. The Anti-Incrustant is first dissolved in the Cistern, and then forced by the pump direct into the Feed water connection going to the inlet of the Economiser, with the result the composition is introduced in small regular quantities making same effective. By treating the water before entering the Economisers the greater part of the impurities are deposited in the Economiser in a soft state where it is easily got rid of by means of the Blow-off Valve.

P.H.C. Improved Nasmith's Return Steam Trap.

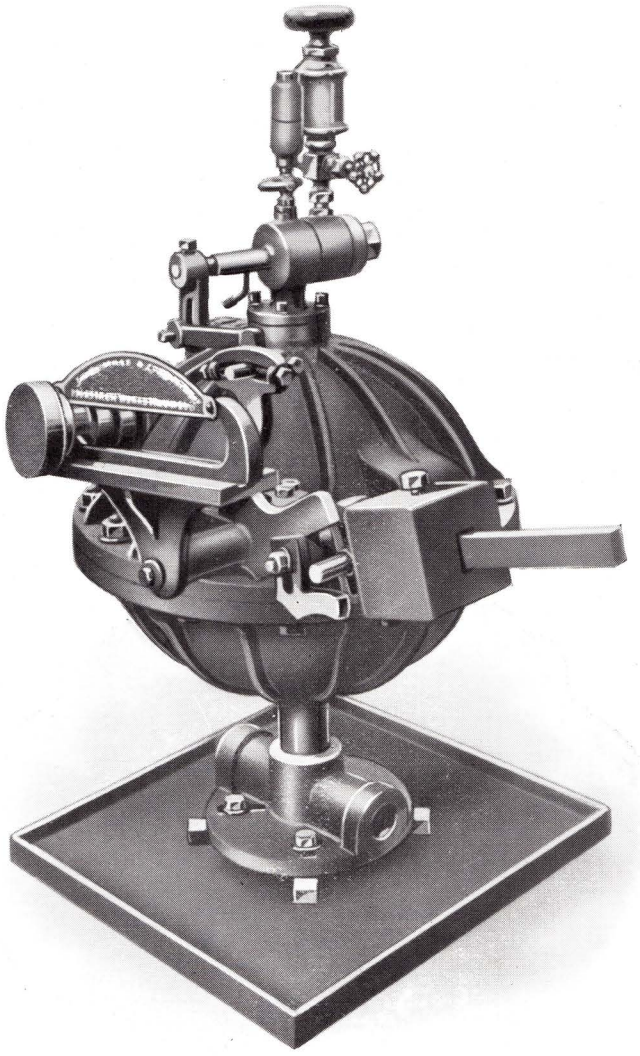


Fig. 90

DESIGNED AND CONSTRUCTED TO OPERATE AT ALL PRESSURES UP TO 200 lbs.

The best and most satisfactory apparatus for returning condensation water from Mill heating pipes direct to the Boiler.

Condensation returned from Low Pressure steam pipes to boilers working at any higher pressure.

The principle of returning condensation water from all kinds of heating pipes direct to the boilers is acknowledged to be a great economy of fuel and labour, but it is not generally known that this can be successfully accomplished from almost every system of pipes, no matter whether the discharges are below or above the boilers.

The P.H.C. IMPROVED NASMITH'S RETURN STEAM TRAP will **AUTOMATICALLY** return such water to the boiler, and the economy is so pronounced that the cost of installing the trap is repaid in a very short time, often during the first few weeks.

POWER HOUSE COMPONENTS LTD., Albion Chambers, King Street, NOTTINGHAM.

P.H.C. Improved Nasmith's Return Steam Trap.

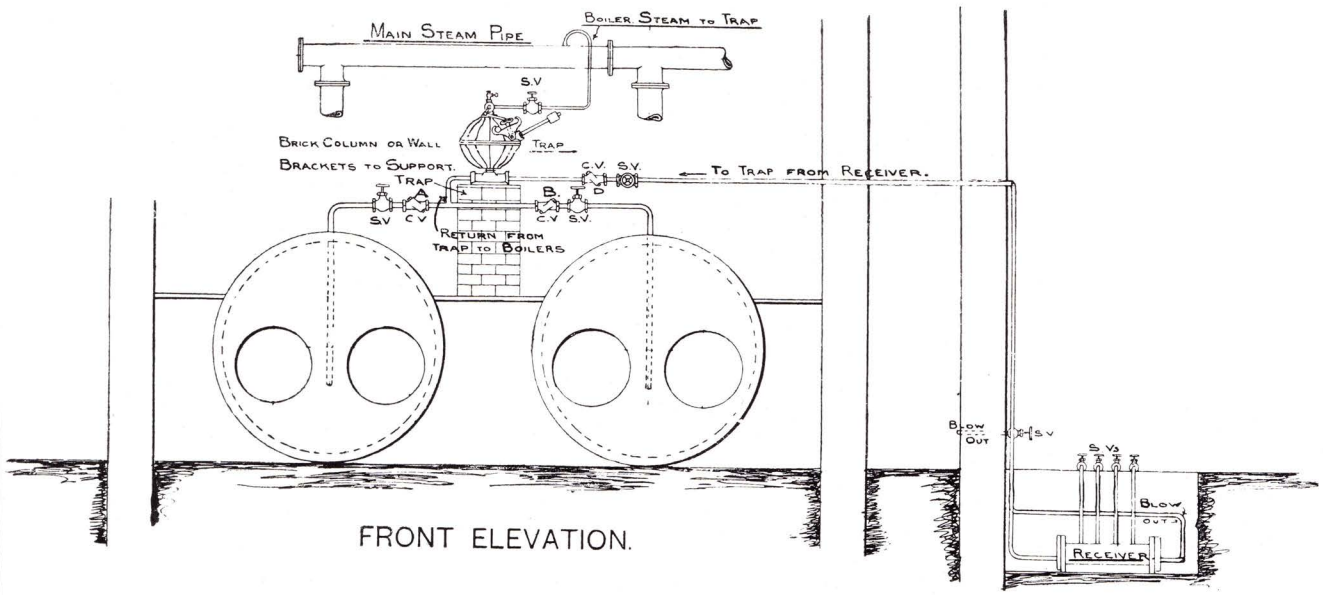


Fig. 91.

GENERAL ARRANGEMENT WITH LANCASHIRE BOILERS.

The Return Steam Trap is undoubtedly the most economical apparatus that can be applied to a steam generating plant, where condensed steam has to be dealt with.

We guarantee the same Level of Water in the Boiler every morning as was left when closing down the previous night, without the least attention, thus dispensing with the services of a watchman during the night and also the early attendance of the fireman each morning for pumping the water up to the correct level.

A large saving of Feed water is therefore effected. All water resulting from Condensed Steam is usually pure and free from deposit, and is consequently the very best water for boiler feed. This water is all run to waste when using ordinary drain traps, such loss is therefore entirely prevented.

Condensed Steam can by means of this Trap be **returned at a high temperature** to the Boiler. It is therefore obvious good economy will result by using high temperature feed water, seeing every 10° Fah. the feed water is raised represents a direct saving of 1% in Fuel.

The Return Steam Trap is Automatic and Reliable, and is designed for dealing with large quantities of condensation such as in Bleach, Dye and Calico Printing Works, Paper Mills, Laundries, Public Baths, &c.

WE ARE PREPARED TO INSTALL THE TRAP ON APPROVAL FOR ONE MONTH.

POWER HOUSE COMPONENTS LTD., Albion Chambers, King Street, NOTTINGHAM.

P.H.C. "CONNYITE" ASBESTOS PACKINGS

FOR HIGH PRESSURE STEAM AND SUPERHEAT.

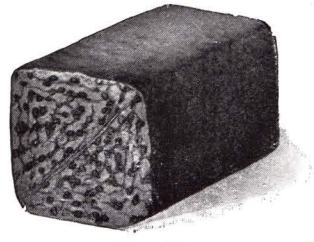


Fig. 66.

HIGH PRESSURE ENGINE PACKING.

THIS packing is suitable for High Pressure Steam and Superheat. The peculiar design appeals to most engineers, and it is often used instead of the expensive all metallic packings to resist the extreme pressures met with in engines of the Compound Triple Expansion type.

MULTICORE PACKING.

THIS illustrates a high grade packing described as Asbestos Multicore Packing, and can be supplied round or square in sizes from $\frac{1}{4}$" upwards. A packing very often in demand.

We recommend that with the packings Fig. Nos. 66 & 67, a ring made of Self Lubricating packing as illustrated on this page be placed both at the top and bottom of the stuffing box.

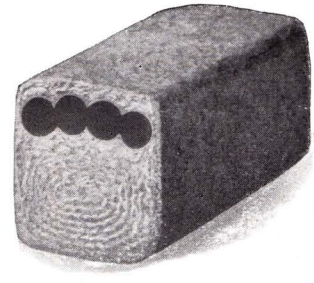


Fig. 67.

Fig. 68.

IMPREGNATED TWIST FOR SMALL VALVES.

THIS special impregnated twist is manufactured specially for the packing of small valve spindles. It is always pliable, can be unstranded if necessary and used for any size. Under steam heat and high pressure steam it gives excellent service, retaining its lubricative qualities indefinitely. Sizes 1/8", 3/16", 1/4" and 3/8" diameter. Put up on spools containing 1 lb. nett, each spool neatly boxed.

SELF-LUBRICATING VALVE PACKING.

THE packing here illustrated is one of the finest self-lubricating packings which it is possible to obtain. Plaited from pure Asbestos Yarn, which is treated with a special lubricative compound, it is suitable for all kinds of work. Most commonly used for the packing of valve spindles where high pressure and temperatures are set up. Supplied in sizes from $\frac{1}{4}$" and upwards, round or square sections, and in boxes containing approximately 8 lbs.

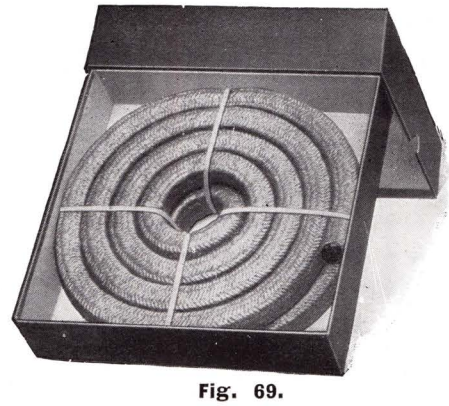


Fig. 69.

"CONNYITE" RINGS AND JOINTS

Registered Trade Mark 407073.

For superheated steam, oils, acids and alkalis, air and hydraulics, and particularly for Fuel Economisers.

A THOROUGHLY RELIABLE JOINTING FOR ALL CONDITIONS.

"CONNYITE"

will keep Joints Tight under the highest pressure and temperatures met with in Modern Engineering practice.

"CONNYITE"

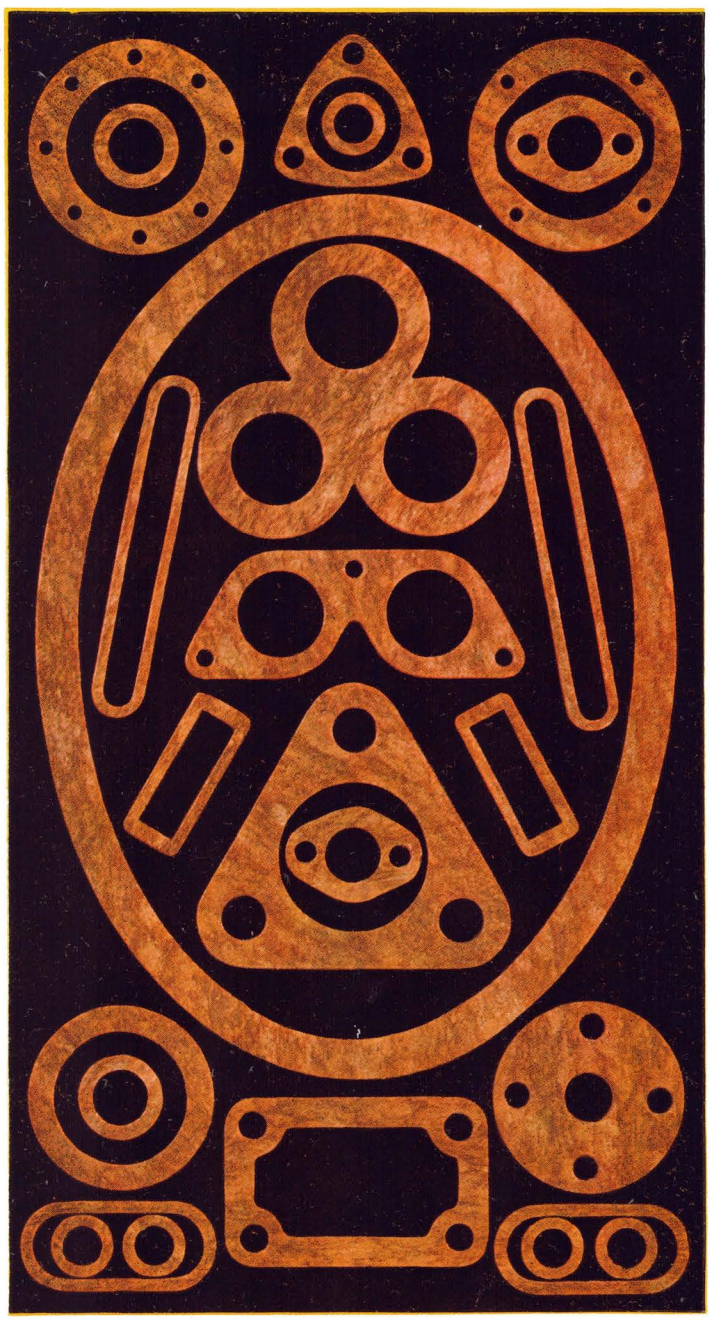
is so carefully made it will not throw machine parts out of alignment.
The most important joints of reciprocating and turbine engines can be made with Connyite with absolute accuracy of alignment.

"CONNYITE"

is indispensable for all joints which have to be frequently opened or with constantly varying expansion and contraction.

"CONNYITE"

Joints can be guaranteed to give satisfaction and once used will always be used.



"CONNYITE"

is economical in use because of its capacity to "stay put."
A joint made with Connyite does not need to be constantly followed up.

"CONNYITE"

is economical because it can be used over and over again.
It does not adhere to the flanges and joints can be opened and re-made with the minimum of time and trouble.

"CONNYITE"

does not burn, squeeze or blow out in service and will thus cut down your yearly joint costs.

"CONNYITE"

Rings and Joints can be cut from any thickness of sheet, $\frac{1}{64}$" and upwards.

POWER HOUSE COMPONENTS, LTD.

ALBION CHAMBERS, KING STREET, NOTTINGHAM.

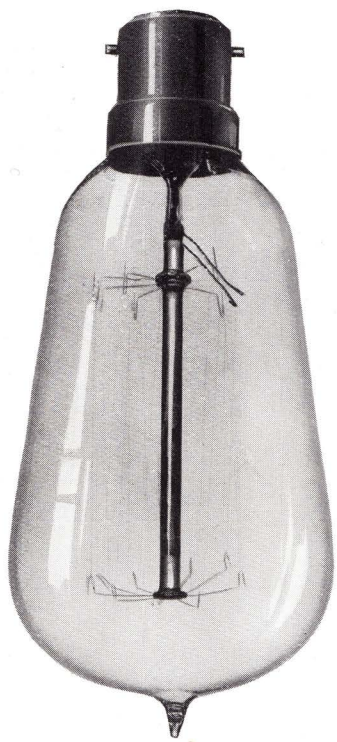
Telegrams—"Components," Nottingham. *Telephone—4616.*

P.H.C. ELECTRIC LAMPS

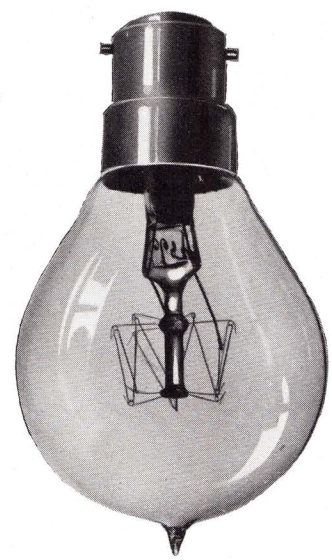
FOR

RELIABILITY AND VALUE.

WE ARE IN A POSITION TO QUOTE YOU COMPETITIVE PRICES FOR MOST TYPES OF LAMPS FOR INDUSTRIAL AND OTHER PURPOSES.



M.F. Type.



Traction Type.

PLEASE SEND US ENQUIRIES & SPECIFICATIONS OF YOUR REQUIREMENTS.

POWER HOUSE COMPONENTS LTD., Albion Chambers, King Street, NOTTINGHAM.

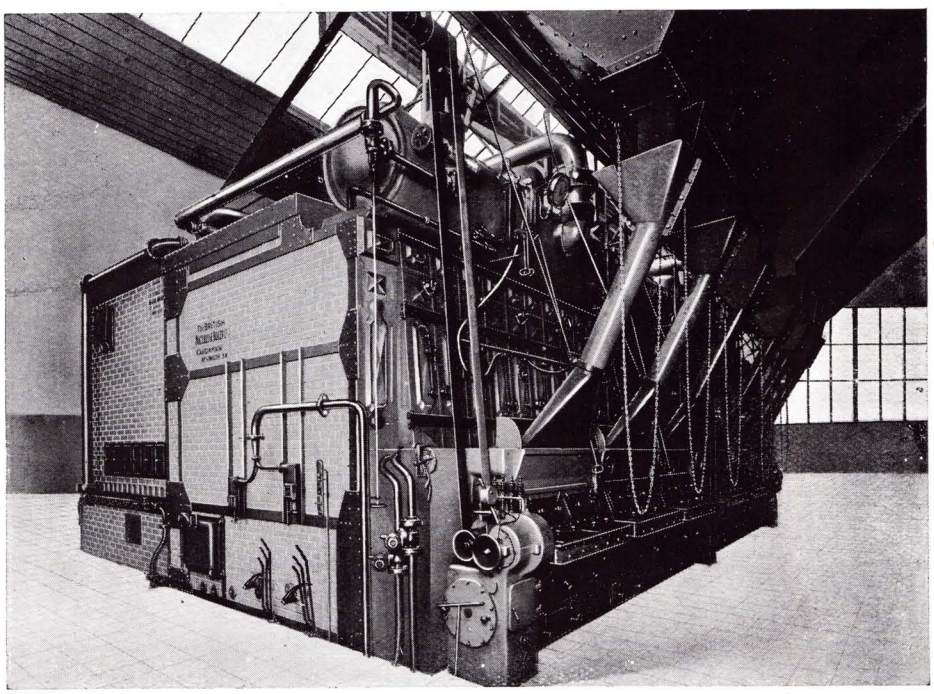
PHC

POWER HOUSE COMPONENTS, LTD.,

ALBION CHAMBERS, KING STREET, NOTTINGHAM.

Telegrams—"Components," Nottingham. *Telephone 4616.*

THE BRITISH NICLAUSSE WATER TUBE BOILER.



THE MOST MODERN CONSTRUCTION.

RELIABLE AND ACCESSIBLE.

POWER HOUSE COMPONENTS, LTD., Albion Chambers, King Street, NOTTINGHAM.

THE BRITISH NICLAUSSE WATER TUBE BOILER

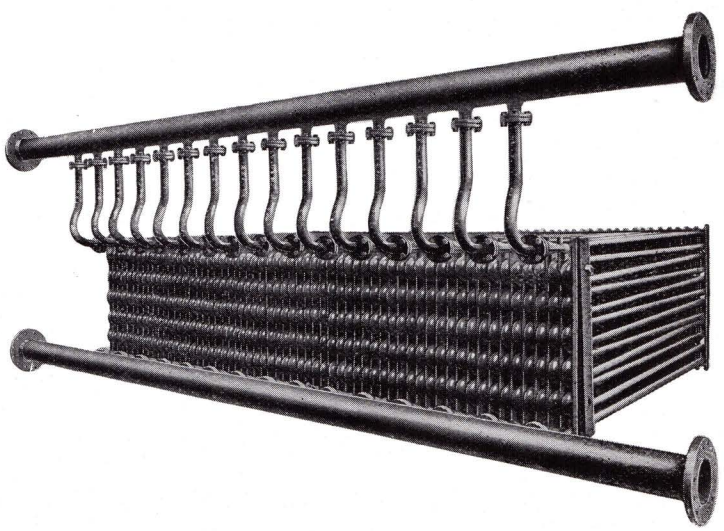


Fig. 110.

THE SUPERHEATER.

The Superheater is fixed above the Water Tubes of the Boiler and is composed of steel tubes made up of independent elements connected to the Boiler. These are coupled to two headers, one above and one below. The saturated steam enters by the higher pipe and the superheated steam by the lower one. This method of superheating permits an even circulation of the gas and assures a fairly constant temperature at varying gas velocities. The sections of tubes are interchangeable, enabling rapid replacement in case of need, and all the parts are easily accessible.

THE BRITISH NICLAUSSE WATER TUBE BOILER.

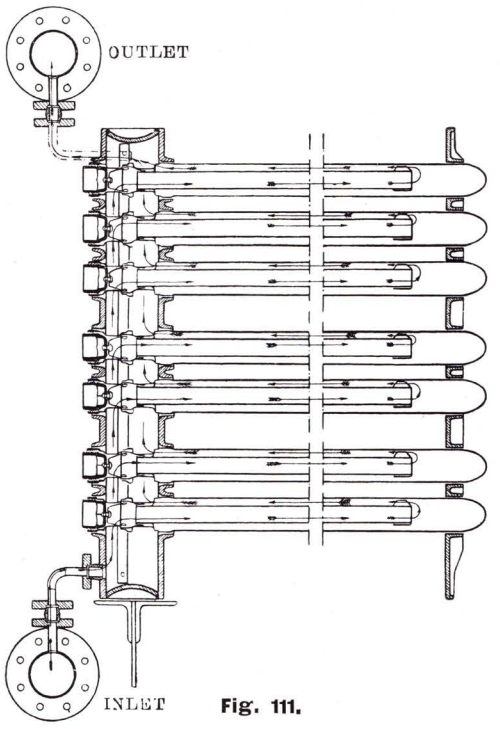


Fig. 111.

SECTION OF ECONOMISER.

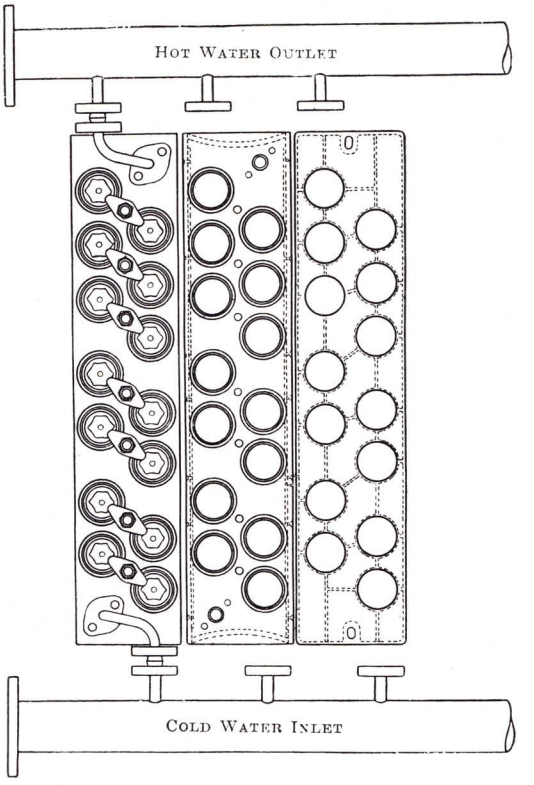


Fig. 112.

THE ECONOMISER.

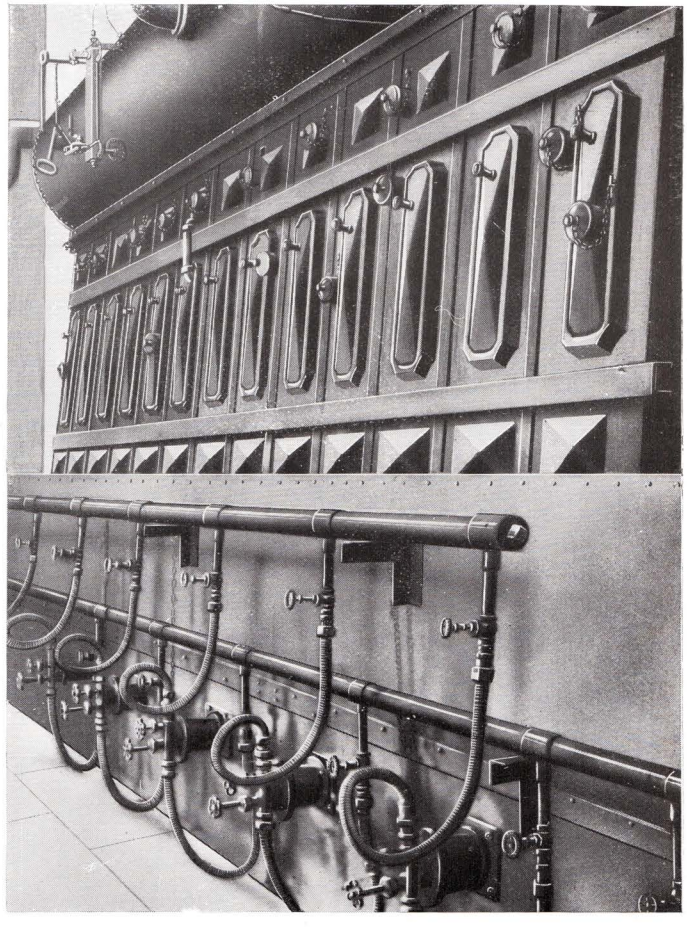
The Economiser brings the feed water to a high temperature before it enters the Boiler, and is generally placed above the superheater. It consists of drawn steel seamless tubes containing interior heater tubes which are fixed to collectors by metal to metal joints. These are similar to the Boiler evaporating tubes and present the same advantages for quick and easy replacing, cleaning, &c.

By means of the Interior heater and Circulation tubes an ascending movement of the water is effected giving perfect circulation, and also ensures an equal proportion of water in all the tubes composing the unit.

POWER HOUSE COMPONENTS, LTD., Albion Chambers, King Street, NOTTINGHAM.

THE BRITISH NICLAUSSE WATER TUBE BOILER

AS INSTALLED AT THE SOUTHEND-ON-SEA CORPORATION'S ELECTRICITY WORKS.



NICLAUSSE BOILERS OPERATED WITH OIL FUEL

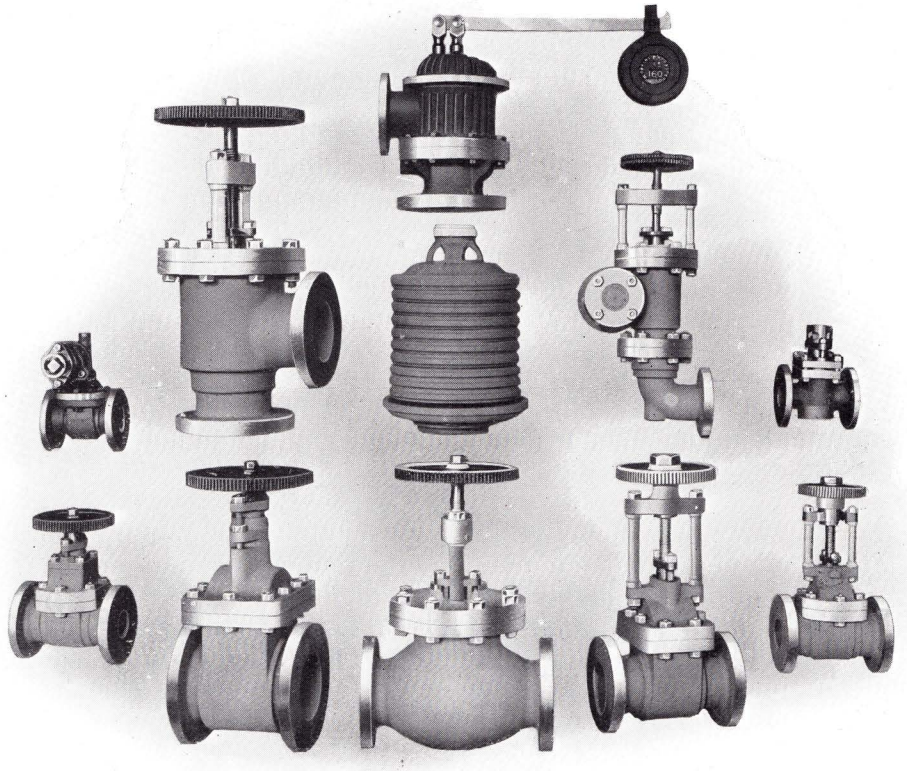
SHOWING EXTERNAL ARRANGEMENT OF THE BURNERS.

POWER HOUSE COMPONENTS, LTD., Albion Chambers, King Street, NOTTINGHAM.

P.H.C. BOILER MOUNTINGS.

IN GUN-METAL, IRON AND SIEMENS-MARTIN'S STEEL.

Engine Fittings of Every Description.



All Types of Valves for High-Pressure Steam Mains and Superheated Steam,

ESTIMATES TO SPECIFICATION FOR VALVES FOR ALL PURPOSES.

POWER HOUSE COMPONENTS, LTD., Albion Chambers, King Street, NOTTINGHAM.

P.H.C. GUN METAL "NAP" VALVE

(INSIDE SCREW PATTERN),

FOR HIGH PRESSURE AND SUPERHEAT.

FITTED WITH RENEWABLE "NICKEL ALLOY" VALVE AND SEATING.

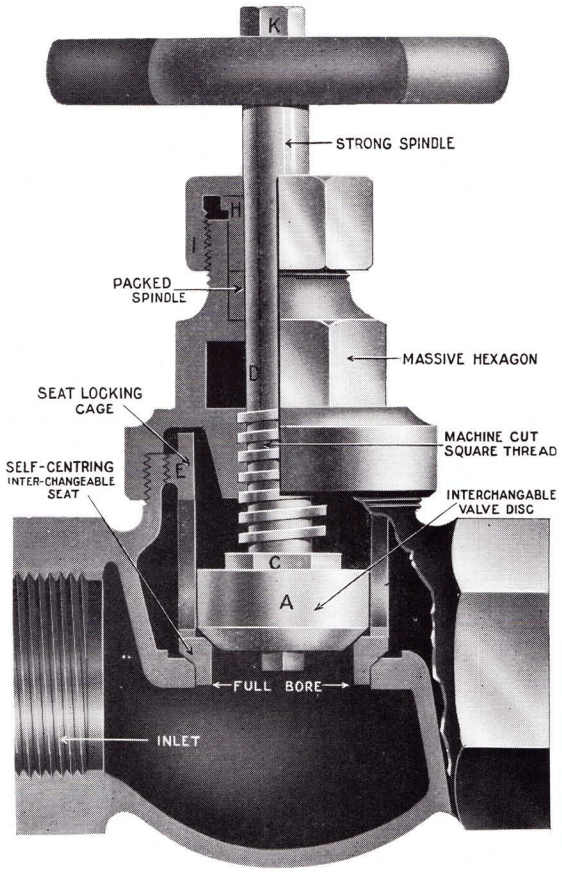


Fig. 82.

These "Nap" Valves are made of best gun metal, and are fitted with inter-changeable seat and disc made of extra tough "Nickel Alloy," and have been designed with a view to maintaining valve efficiency in the most simple, yet mechanically perfect manner. You do not require to take the valve off the pipes when changing seat and disc. Suitable for 200 lbs. working pressure and 500° F. superheat.

"ALL" PARTS INTERCHANGEABLE.

Bore	¼ & ⅜"	½"	¾"	1"	1¼"	1½"	2"	2½"	3"
Screwed Ends ...	**7/8**	**12/8**	**15/-**	**20/8**	**29/4**	**36/-**	**48/4**	**75/-**	**100/-**
Flanged Ends ...	—	**20/4**	**23/5**	**32/4**	**44/-**	**56/4**	**70/4**	**103/-**	**133/4**
Diameter of Flanges..	—	3⅜"	4"	4¾"	5¼"	5½"	6½"	7¼"	8"
Spare Set, N.A. Valve & Seating ...	**2/-**	**2/8**	**3/4**	**4/-**	**5/-**	**6/8**	**8/8**	**13/4**	**16/8**

ILLUSTRATES SIMPLICITY OF RENEWING VALVE AND SEAT.

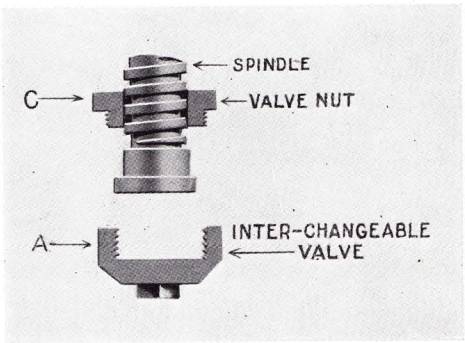


Fig. 83.

TO RENEW THE VALVE.

To renew the inter-changeable Valve Disc A, hold in a vice by means of provided square under the bevel, and release the lock nut C. When fitted together the Valve Disc is free to rotate.

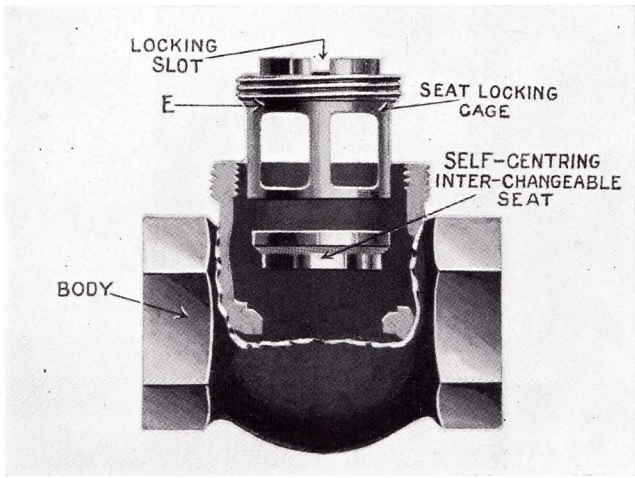


Fig. 84.

TO RENEW THE SEAT.

The Inter-changeable Seat B is held in position by the seat locking Cage E. To renew the seat, unscrew cage and withdraw. The Seat is left loose on the bevel of seating bridge in the body and only requires lifting out.

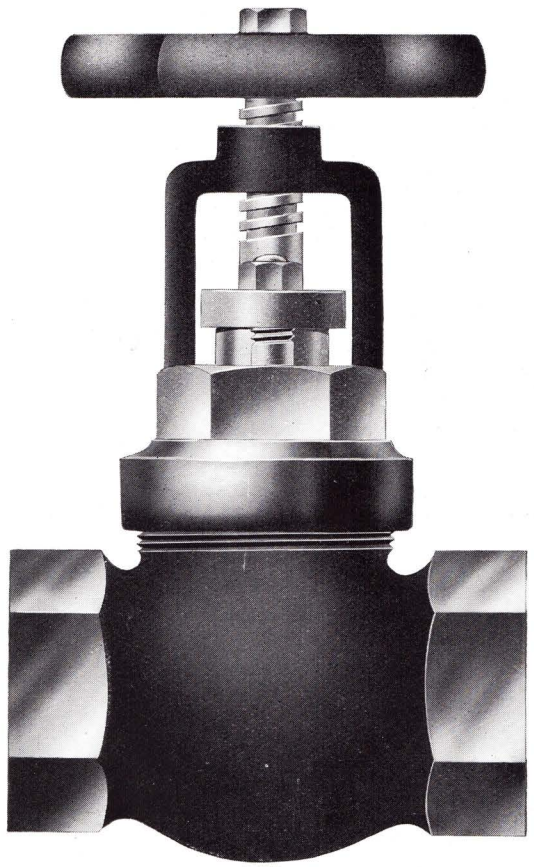


Fig. 80.

P.H.C. GUN METAL "NAP" VALVE.

(OUTSIDE SCREW PATTERN)

For High Pressure and Superheat.

FITTED WITH RENEWABLE "NICKEL ALLOY" VALVE AND SEATING.

The above pattern is specially recommended for use on superheat installations as in Electric Power Stations, Textile Factories, Collieries. etc. For 200 lbs. W.P. and 500°F. superheat.

"ALL" PARTS INTERCHANGEABLE.

Bore	½"	¾"	1"	1¼"	1½"	2"	2½"	3"
Screwed Ends	14/-	16/7	22/8	32/4	39/8	53/4	82/8	110/-
Flanged Ends	21/8	25/-	34/4	47/-	60/-	75/4	110/8	143/4
Diameter of Flanges	3¾"	4"	4¾"	5¼"	5½"	6½"	7¼"	8"
Spare Sets, N.A. Valve and Seating	2/8	3/4	4/-	5/-	6/8	8/8	13/4	16/8

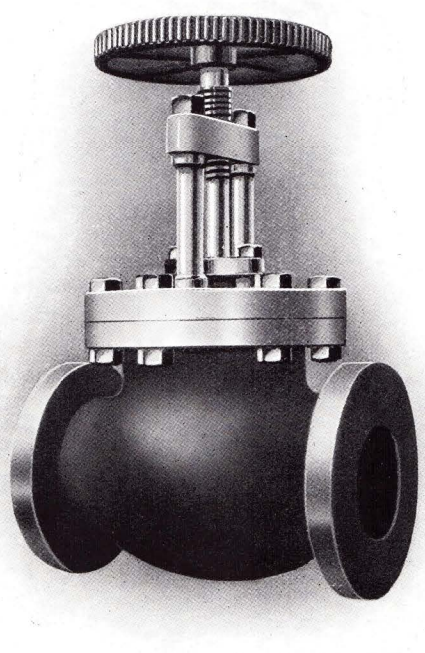


Fig. 81.

P.H.C. GLOBE STOP VALVE

FOR STEAM PRESSURES
:: UP TO 225 LBS. ::

No. 81. For 160 lbs. Pressure, Cast Iron Bodies and Covers.

Fitted with **Nickel Alloy** Valves and Seats. Seats studded in. Unless otherwise specified.

No. 81A. For 225 lbs. Pressure - Siemens-Martin's - Cast Steel Bodies and Covers.

Bore ...	ins. 1½	ins. 2	ins. 2½	ins. 3	ins 3½	ins 4	ins. 4½	ins. 5	ins. 6	ins. 7	ins 8	ins 9	ins. 10	ins 12	ins. 14
Flanges, B.S.T. No. 2	5½	6½	7¼	8	8½	9	10	11	12	13¼	14½	16	17	19¼	21¾
Length over Flanges	8	10	11	12	12½	14	15½	18	20	22	23	24	26	30	36
Height from Centre to Top Nut above Wheel—(Open)	13¾	15⅜	16⅜	17⅜	17½	20¼	20¾	22⅝	25¾	27⅝	31	31¾	33	37⅜	38
Do.—(Shut)	13	14⅞	15¾	16⅝	16⅝	19¼	19⅝	21⅜	24¼	25⅞	29	29½	30⅜	34⅜	34½

P.H.C. PARALLEL SIDE VALVES.

FOR STEAM PRESSURES UP TO 225 LBS.

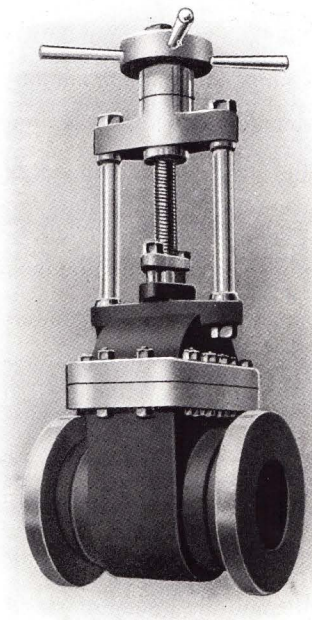


Fig. 85.

No. 85.

For 160 lbs. Pressure. Cast Iron Bodies and Covers.

No. 85A.

For 225 lbs. Pressure. Siemens-Martin's Cast Steel Bodies and Covers.

Bore	ins 2	ins. 2½	ins. 3	ins. 3½	ins. 4	ins. 4½	ins. 5	ins. 6	ins 7	ins 8	ins. 9	ins. 10	ins. 11	ins. 12
Flanges, B.S.T. No. 2	6½	7¼	8	8½	9	10	11	12	13¼	14½	16	17	18	19¼
Length over Flanges	8¾	10	11½	12½	13	14	15	15½	17	17½	18	18	20	20
Height from Centre of Valve to Top Nut above Wheel ...	14	15¼	16½	18	22	24	25½	32	35	42	45	48	51	54

P.H.C. JUNCTION VALVE.

FOR STEAM PRESSURES UP TO 225 LBS.

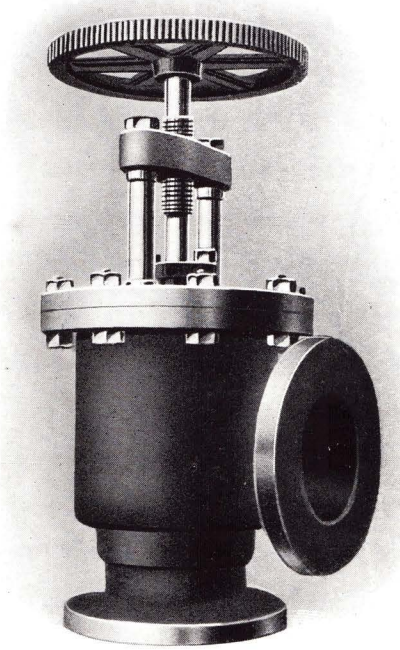


Fig. 86.

No. 86.

For 160 lbs. Pressure Cast Iron Bodies and Covers.

Fitted with **Nickel Alloy** Valves and Seats. Seats studded in. Unless otherwise specified

No. 86A.

For 225 lbs. Pressure Siemens-Martin's Cast Steel Bodies and Covers.

Bore	ins. 1½	ins. 2	ins. 2½	ins. 3	ins. 3½	ins. 4	ins 4½	ins. 5	ins. 6	ins. 7	ins. 8	ins 9	ins. 10	ins. 12	ins. 14
Flanges, B.S.T. No. 2	5½	6½	7¼	8	8½	9	10	11	12	13¼	14½	16	17	19¼	21¾
Height from Centre to Top Nut above Wheel—Open	12⅞	14	15⅞	17	17⅛	19¾	20⅛	21	24½	27¾	31	30¾	34	37½	41
Do. —Shut ...	12½	13½	15¼	16¼	16¼	18¾	19	19¾	23	26	29	28½	31½	34½	37½
Centre of Valve to Side and Bottom Branches	4½	5	6	6	6½	7	8	8½	10	10½	11	12	13	14	15

PHC